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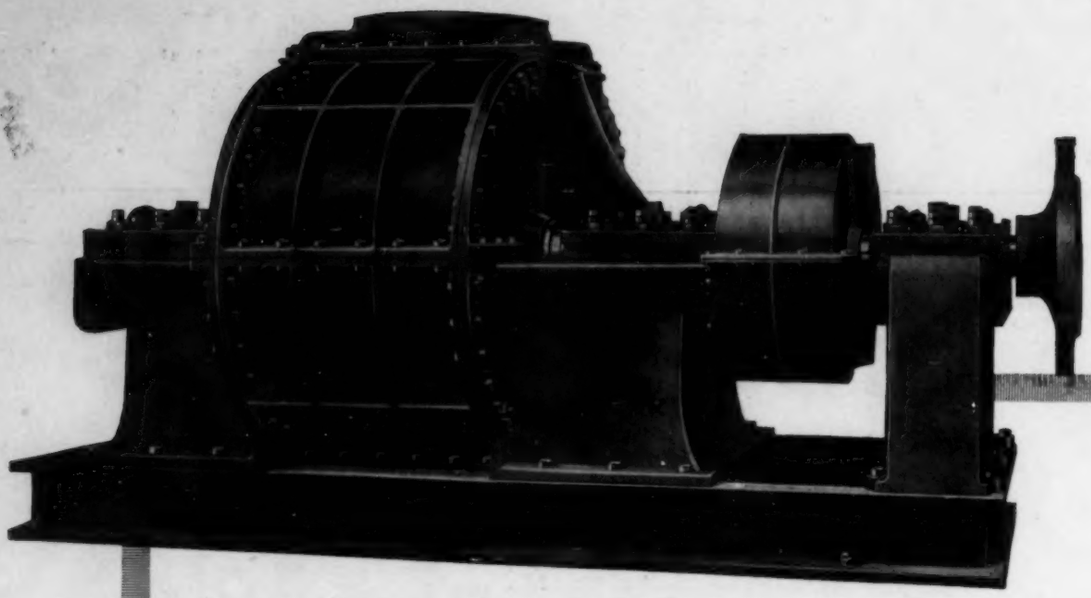
Engineering Directory, pages 154-155. Classified Advertisements, pages 165-168.



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NEW YORK
114 Liberty Street

THE IRON TRADE REVIEW

Vol. LXI Cleveland, November 1, 1917 *No. 18*

Remaining Prices Still Uncertain

Divided Belief Grows in Industry Whether Government Will Fix Additional Quotations or Leave Them to Market Adjustment—Suggestion of Contract Abrogation Brings Vigorous Protest—More Buying at Fixed Schedule

WHETHER government edict of market adjustment will determine the lines of iron and steel yet untouched by federal action remains an open question. A division of opinion which is growing weekly exists in the industry on this point. Nothing has come out of Washington during the week to throw a further light upon what the government proposes to do in this direction. In the absence of any positive contrary statement that prices will not be fixed, the opinion exists that some additional price announcements may be expected. A meeting of the general committee of the American Iron and Steel institute, at New York, is thought to be considering a plan whereby it may make announcements direct with the government's approval. Further deliberation on the suggestion of the federal trade commission as to a possible abrogation of contracts has resulted in a storm of protest from the industry and from business generally against so revolutionary a proposal. The strongest argument against the inviting of commercial chaos by such a step is that it is unnecessary as aid to the government in obtaining material nor will it insure more equitable distribution of the restricted tonnage open to private buyers.

Finished Sales More Liberal

Finished steelmakers continue gradually to swing in line with more liberal sales at the fixed prices. Adjustments also are being made in products not yet covered by federal action. Concurrently signs of some revival in activity in extra-war business have been appearing. Domestic railroads are more prominent as buyers. Inquiries for cars for home use are the largest in months and some orders are being closed. Bridge work is appearing in heavier volume. New inquiries for 1919 rails have been put out. Some commercial building propositions again are being attracted into the market, including a 7000 to 9000-ton warehouse at Chicago. Steel bar consumers are inquiring more freely for first half contracts. Flat quotations of 2.90c and reservations at the same figure have been made. The Bethlehem Steel Co., a newcomer in the plate market, has been selling at 3.25c against new capacity recently started. Certain mills continue to offer universals at 3.25c, mill.

War Orders Are Heavy

Government business is going ahead heavily. Satisfaction of the army shell steel needs to Sept. 1, 1918, estimated at 1,500,000 tons of 2 to 11½-inch rounds, is being arranged for. The iron and steel institute commiitee has canvassed makers as to what portion of this tonnage they can supply. The navy's similar requirements still are to be brought forth formally. From 100,000 to 200,000 tons of shell steel also are to be bought for the allies. The 30,000 cars for Russia, for which Washington has been negotiating, have been closed. Thirty shops will fabricate the 69,000 tons which the Submarine Boat Corp. will need for government ships.

Iron Market Quite Active

Another week has failed to bring the awaited announcement on pig iron differentials. Settlement of some of the special grades is reported to be the cause of the delay. Makers of the latter classes now have submitted some reductions of their original schedules. Certain producers of low phosphorus iron have been selling at $55, eastern furnace. Ohio makers of silveries and bessemer ferrosilicon have announced tentative prices for 1918 on the basis of $40, furnace, for 6 per cent silveries, and $56.50 for 9 per cent bessemer ferrosilicon. New inquiry for various grades of iron for delivery to July 1, 1918, is fairly active and growing. Furnaces accepting some orders at the agreed base prices plus the differentials as fixed later are more numerous. Buffalo has booked a large tonnage and the week's sales in eastern Pennsylvania are at least at 20,000 tons. Southern makers are taking more orders. Large consumers of iron south of the Ohio river, however, express disfavor with the $33, furnace, price, since it removes the freight differential in their behalf from Birmingham to the Ohio river, upon which many of them have based their location and manufacturing operations.

The Iron Trade Review

EDITORIAL

The Crucible of Victory

AMERICA'S great iron and steel industry has reconsecrated its tremendous energies to winning the war for democracy and freedom. Production and yet greater production is the watchword of the hour—and to this supreme need of unconquerable America all other considerations, prices, profits, competitive advantages, the opportunity to exploit favorable industrial conditions, and where necessary even contract obligations, have been subordinated. America is now furnishing and will continue to furnish her armies and her allies with steel in prodigal abundance, tempered, shaped and fashioned to the needs of war, as long as the threat of despotic domination of free peoples rears its ugly head in the world.

Such was the message, in unmistakable tones, sent forth to the world from the thirteenth general meeting of the American Iron and Steel institute at Cincinnati during the closing days of last week. Like our English brothers in arms, we are undemonstrative people. Yet no one could have attended the great gathering at Cincinnati without opening the floodgates of his feelings and emotions.

For months the iron and steel industry has been working. Last week it spoke. Its voice, articulate with unity and power, will carry across the seas the message of victory.

Judge Gary's memorable address was followed by an enthusiastic impromptu patriotic demonstration at which ringing appeals were made by Joseph G. Butler Jr., James A. Campbell, Charles M. Schwab, James A. Farrell, Robert Hobson and W. A. Rogers. Following this great demonstration, which included the lusty singing of "America", Judge Gary asked all to stand who were willing to make sacrifices, forget prices and devote all of their energy to supporting the government and winning the war by turning out every pound of steel possible. Every man in the thronged convention room jumped to his feet and the pledge was made amid ringing cheers.

That the iron and steel industry is giving much more than lip service to the support of the war is known to all students of industrial statistics. In fact, iron and steel trade leaders are doing their bit in many directions. Nicholas Longworth, a member of the ways and means committee of the house of representatives, pointed out at the banquet on Friday night that during the entire period when the big war revenue measures were under consideration at the recent session of congress, there was less kicking, fewer protests and more generous co-operation from the iron and steel business than from any other great industry. Practically every speaker added to the testimony. Charles M. Schwab told how 90 per cent of the output of the great Bethlehem organization is devoted directly to war purposes. "Uncle Joe" Butler of Youngstown, venerable and energetic, said two steel companies in his home city subscribed the full second Liberty loan quota in the Youngstown district, while at the same time the employes of these and other companies added many millions more to the total. At the same time, Mr. Butler voiced the temper of the meeting in his denunciation of traitors and slackers, some of the most prominent of whom he did not hesitate to name.

The sentiment of the assembly was expressed on many other grave problems now confronting the American people. The necessity for stabilizing labor conditions received special consideration. George M. Verity, president of the American Rolling Mill Co., Middletown, O., took the bull by the horns and pointed out that iron and steel manufacturers have devoted comparatively little co-operative effort to stabilizing and standardizing labor conditions throughout the country. He emphasized the necessity for a great comprehensive survey of the labor and welfare situation. At the same time it was urged that the institute give problems of this sort more detailed consideration. Several prominent steel manufacturers did not hesitate to state that in view of the pressing nature of labor and other problems the institute would do well to conduct at least a portion of its meetings along somewhat less formal lines. Great benefits flow from the opportunity to get together at the institute meetings, but these alone are not believed to be all-sufficient in these times. More comprehensive discussion of the great problems of the day seems to be demanded and it is probable also that the institute could increase its effectiveness by the appointment of committees to work continuously on these matters.

Hands Off the Contract

NO more deadly proposal to general business could have been raised than the suggestion of the possibility of the abrogation of contracts contained in the recent general letter of inquiry which the federal trade commission has sent broadcast to iron and steel producers. While the communication in itself does not show that the federal trade commission actually contemplates an attempt to bring about such a radical upsetting of business standards,

the mere fact that some members of that body have been giving thought along this line is ample cause for apprehension. Chairman Davis of the commission already has expressed himself as an advocate of this general policy. At the recent hearing on the Pomerene bill providing sweeping control over the iron and steel industry, he gave voice to his opinions to this effect.

Sanctity of contracts is the cornerstone of all business transactions. It is the badge of integrity and of good faith which is as fixed as the common law. To waive this principle even temporarily as a war measure is to undermine the basic formula of everyday commercial dealing and to precipitate a condition that quickly would bring chaos. For the government to establish the precedent that a great emergency, such as war, warrants the abrogation of contracts is to open the door to an endless train of disastrous possibilities. If one crisis justifies this remedy, it is not a far step to invoking it, in the event of some other, such as a great trade depression. If sales contracts of iron and steel are to be nullified, it is certain that this process will not stop there but will extend to raw materials under purchase, to equipment, to construction work undertaken, even to labor. If buyers may abrogate now when contract prices are higher than government prices, the sellers may claim a similar privilege when a rising market finds them filled with low priced contracts. Anyway the proposition is measured it has no basis either in ethics or in law. It means nothing short of utter confusion and demoralization.

On the practical side, the greatest argument against wiping producers' books clean is that it is not necessary. The government at present is filling its requirements to the exclusion of all other customers and prior private commitments. Nothing it could do would improve the service which it is receiving from the producers since it has first call upon all capacity. Similarly private buyers in general would not be helped because the sum total of supplies is limited by productive capacity minus government needs and would not be increased.

If the trade commission aims to relieve of high-bought materials the mills which do not produce their steel, it is considering a weird course analagous to the burning down of a house to get rid of a rat. The mills in this position relatively are few. It would be far simpler and wiser to allow them to sell at a price at which they could absorb their high-cost steel than to pull down the whole structure of business to accomplish identically the same result, which is to insure the country of their continued operations. In fact several of these mills already are following this course and are selling well above the government figures.

It is difficult to believe any governmental agency versed in trade practices as the federal trade commission is supposed to be, officially would lend even its mention to such a fanciful proposal. Of all times the present least will permit of any tampering.

A Burdened Industry Needs Help

UNDENIABLY a shortage of machine tools exists. The production problems of the builder have increased in number and in difficulty of solution. Raw materials cost more and while governmental price-fixing eventually may alleviate this condition, the somewhat turbid state of the various metal markets has not been entirely clarified; transportation difficulties have been bothersome; labor unrest has been intensified, and the number of skilled workmen has been depleted partly because of the inflexible draft exemption system. Production not only must be maintained, but must be increased if the nation is to carry on its gigantic war program with expedition. Thus far, the much-heralded advent of women in American industrial work has done little toward filling the thinning ranks of skilled workmen.

Several prominent machine tool dealers lately have been called to Washington for consultation in regard to the government's proposed task of taking an inventory of all available used equipment in the United States not now used for war work. This is a step toward the utilization of such equipment in relieving the over-demand on present production capacity. The plan is feasible and should aid in partially relieving the order-congested market. Finally, the acquisition of Canadian shellmaking machinery, some of which now is available, should help to satisfy domestic demands. England's munition-making capacity has been augmented to such an extent that little or no dependence need be placed on the product of Canadian factories. As a result many Canadian plants are to be dismantled and the equipment sold, thus making this machinery available for domestic munition-making. Scarcely any expedient can be relied upon to solve the problem alone; but new adaptations or arrangements of the nation's machine tool reserve and other seemingly unimportant factors, when taken advantage of properly, can be made of effective use in helping out the overtaxed industry.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 970

PIG IRON

(Delivery this year.)

Bessemer valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
*Malleable, Philadelphia	
*Malleable, Buffalo	33.50
*No. 1X, Phila.	35.25
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
*No. 1 foundry, Chicago	
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.00 to 34.25
No. 2X foundry, N. J. tide.	34.25 to 34.50
No. 2X foundry, Buffalo	33.00
*No. 2 plain, Philadelphia	33.50 to 33.75
*No. 2 plain, N. J. tide	33.75 to 34.00
*No. 2 plain, Buffalo	33.00
*No. 2 southern, Birmingham	33.00
*No. 2 southern, Cincinnati	35.90
*No. 2 southern, Chicago	37.00
*No. 2 southern, Phila. del.	38.30 to 38.80
No. 2 southern, Cleveland	37.00
*No. 2 southern, N. Y.	38.75 to 39.25
*No. 2 southern, Boston	39.00
*No. 2 south. interior, N. E.	39.00 to 39.75
*No. 2 southern, St. Louis	35.40
*Virginia, No. 2X, furnace	33.50
*Virginia, No. 2X, Phila.	36.25
*Virginia, No. 2X, Jersey City	36.50
*Virginia, No. 2X, Boston	36.75
*Gray forge, eastern Pa.	32.00
Gray forge, Pittsburgh	32.95
*Gray forge, Birmingham	
*Silveries, 8 per cent, furnace	
*Silveries, 8 per cent, Chgo.	
*Low phos. standard, Phila.	
*Low phos. Lebanon furnace	
*Low phos., Pittsburgh	
*Charcoal, Superior, Chicago	37.50
*Charcoal, Superior, Buffalo	39.75
*Charcoal, Birmingham	

COKE

(At the ovens.)

Connellsville furnace	$6.00
*Connellsville foundry, contr.	
*Connellsville foundry	
*Wise county furnace, contr.	
*Wise county foundry, contr.	
*Pocahontas furnace, contr.	
*New River foundry, contr.	
*New River furnace, contr.	

FERRO ALLOYS

Ferromanganese, prompt	$250.00 to 275.00
Ferromanganese, last quar.	250.00 to 275.00
Spiegel, 20 per cent fur.	67.50 to 70.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh	170.00 to 180.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	130.00 to 140.00
Bessemer ferrosilicon, 9 per cent.	$56.50
Bessemer ferrosilicon, 10 per cent.	57.50
Bessemer ferrosilicon, 11 per cent.	61.50
Bessemer ferrosilicon, 12 per cent.	65.50
Bessemer ferrosilicon, 13 per cent.	69.50

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
*Forging, Pittsburgh	
*Forging, Philadelphia	
*Forging, Chicago	

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Open hearth, Cleveland	52.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

*Not determined.

SHAPES, PLATES AND BARS

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago.	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia.	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel, Phila.	3.085c
Cotton ties, Pitts., Oct.	$2.14
Bar iron, Chicago	4.50c to 5.00c
Bar iron, Philadelphia	4.685c to 5.185c
Bar iron, Cleveland	4.25c to 4.50c
Bar iron, New York	4.695c to 5.195c
Bar iron, Pittsburgh	4.50c to 4.75c
Hard steel bars, Chicago.	4.25c to 4.50c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.75c to 4.00c
Angle bars, Chicago, base	3.25c to 4.00c
Standard bessemer rails, mill.	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45 lbs., Chic.	70.00
Light rails, 25 to 45 lbs., Pitts.	75.00 to 85.00
Relayers, standard, mill.	38.00 to 40.00
Relayers, light, Chicago	60.00
Relaying rails, light, St. L.	60.00 to 62.00
Spikes, railroad, Pittsburgh.	5.00c to 5.50c
Spikes, railroad, Chicago	5.00c to 5.25c
Track bolts, Pittsburgh	5.50c to 8.00c
Track bolts, Chicago	5.25c to 6.50c
Tie plates, Chicago	$70.00 to 75.00

WIRE PRODUCTS

(Prices of independent makers.)

(To jobbers; retailers 5 cents more.)

Wire nails, Pittsburgh	$3.50 to 4.00
Coated nails, Pittsburgh	4.00
Plain wire, Pittsburgh	3.45 to 3.75
Galvanized wire, Pittsburgh	3.95 to 4.65
Polished staples, Pittsburgh	3.65 to 4.15
Galvanized staples, Pittsburgh.	4.35 to 4.85
Barb wire, painted, Pittsburgh.	3.65 to 4.15
Barb wire, galvanized, Pitts.	4.35 to 4.85
Cut nails, Pittsburgh	4.50

CHAIN, PILING, STRIP STEEL

Chain, ⅜ in. proof coil, Pitts. 9.00c

Sheet piling, base, Pittsburgh 4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 9.00c to 9.50c.

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SHEETS

(In cents per pound.)

SHEET MILL BLACK.

No. 28, open hearth, Pitts.	6.00c
No. 28, bessemer, Pitts.	6.00c
No. 28, open hearth, Chic.	6.215c to 7.215c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	6.50c to 7.00c
No. 28, bessemer, Pitts.	6.50c to 7.00c

GALVANIZED

No. 28, open hearth, Pitts.	7.50c to 8.00c
No. 28, bessemer, Pitt.	7.50c to 8.00c
No. 28, open hearth, Chic.	7.715c to 8.215c

BLUE ANNEALED

No. 10, open hearth, Pitts.	6.00c to 6.50c
No. 10, bessemer, Pitts.	6.00c to 6.50c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila.	

TIN PLATE

(Per 100 lb. box.)

Tin plate, coke base, nom. $10.00 to 15.00

IRON AND STEEL PIPE

(Prices adopted June 18, 1917.)

Steel

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
¼ to 3, butt	42	28½

Iron.

(Prices adopted June 30, 1917.)

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ to 1½, butt	33	17

BOILER TUBES

(Price adopted April 2, 1917.)

Steel, 3½ to 4½ inches, l. c. l.	34
Iron, 3½ to 4½ inches, l. c. l.	28

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	53.50
Six-inch and over, Chicago	50.50
Four-inch, New York	59.50
Six-inch and over, New York	56.50
Four-inch, Birmingham	48.00
Six-in. and over, Birmingham	45.00

Class A pipe is $1 higher than Class B.

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	5.50c to 6.00c
Bands, Pittsburgh	5.50c to 6.00c
Shafting, Pittsburgh, carloads	10 off tollist

RIVETS

Structural rivets, Pittsburgh.	5.25c
Boiler rivets, Pittsburgh	5.35c
Rivets ⅞ in. and smaller, Pitts.	40 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter.)

Rolled thread	40 off
Cut thread	35 and 2½ off
Larger or longer	25 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts.)

Rolled thread	40 and 10 off
Cut thread	40
Larger and longer	30
Cold pressed, semi-finished, hexagon nuts	50 and 10
Gimlet and cone point lag screws	45

NUTS

Hot pressed, square, blank	1.70 off
Hot pressed, square, tapped	1.50 off
Cold pressed, square, blank	1.25 off
Cold pressed, square, tapped	1.00 off
Hot pressed, hexagon, blank	1.50 off
Hot pressed, hexagon, tapped	1.30 off
Cold pressed, hexagon, blank	1.25 off
Cold pressed, hexagon, tapped	1.00 off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products October 31, average for September, 1917, average for July, 1917, and average for October, 1916. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Oct. 31, 1917.	Average prices Sept., 1917.	July, 1917.	Oct., 1916.
Bessemer pig iron, Pittsburgh..	$37.25	$48.28	$57.95	$24.33
Basic pig iron, Pittsburgh.....	33.95	44.45	53.20	20.83
No. 2 Foundry pig iron, Pitts.	33.95	48.95	55.95	21.08
No. 2 Foundry pig iron, Chic..	33.00	49.50	55.00	19.15
Lake Superior Charcoal, Chicago	35.50	59.50	59.50	20.35
Malleable, Chicago	33.50	49.50	55.00	19.50
Southern, No. 2, Birmingham...	33.00	43.50	46.00	15.13
Southern Ohio No. 2, Ironton..	33.00	49.50	54.25	19.38
Basic, eastern Pa.....	33.00	49.50	50.75	20.75
No. 2X Virginia, furnace.....	33.50	50.75	52.25	18.50
No. 2X foundry, Philadelphia...	34.00	52.25	54.25	20.75
Ferro mang., delivered.....	265.00	378.00	430.00	162.00
Bessemer billets, Pittsburgh....	47.50	73.75	100.00	45.75
Bessemer sheet bars, Pittsburgh	51.00	82.50	105.00	45.75
Open hearth sheet bars, Pitts..	51.00	82.50	105.00	45.75
Open hearth billets, Pittsburgh.	47.50	73.75	100.00	45.75
Steel bars, Pittsburgh.....	2.90	3.725	3.875	2.60
Steel bars, Chicago.....	2.90	4.10	4.50	2.80
Iron bars, Philadelphia.....	4.935	4.935	4.759	2.659
Iron bars, Cleveland, local del'y	4.25	4.50	4.50	2.55

	Prices Oct. 31, 1917.	Average prices Sept., 1917.	July, 1917.	Oct., 1916.
Iron bars, Chicago mill.....	$4.50	$4.50	$4.50	$2.35
Beams, Chicago	3.00	4.46	5.88	2.80
Beams, Pittsburgh	3.00	3.75	4.50	2.70
Beams, Philadelphia	3.185	4.435	4.909	2.859
Tank plates, Pittsburgh.....	3.25	6.81	5.63	3.00
Tank plates, Chicago.....	3.25	7.33	9.64	3.19
Tank plates, Philadelphia.....	3.435	7.75	10.159	3.309
Sheets, blk., No. 28, Pittsburgh	6.50	8.75	9.00	3.23
Sheets, blue anld., No. 10, Pitts.	6.25	8.50	8.50	3.13
Sheets, galv., No. 28, Pittsburgh	8.00	9.69	10.25	4.45
Wire nails, Pittsburgh.....	4.00	4.00	4.00	2.63
Connellsville fur. coke.....	6.00	9.63	9.63	3.38
Connellsville fdy. coke.....	7.00*	12.50	12.38	4.88
Heavy melting steel, Pittsburgh.	30.00	35.50	40.25	17.87
Heavy melting steel, eastern Pa.	26.50	31.25	37.00	15.50
Heavy melting steel, Chicago...	27.00	32.60	35.50	16.50
No. 1 wrought, eastern Pa.....	36.75	44.50	54.00	22.00
No. 1 wrought, Chicago.....	30.00	36.23	39.13	17.50
Rerolling rails, Chicago.....	35.50	41.25	46.25	18.75
Car wheels, Chicago.....	25.50	31.00	36.75	12.25

*Not determined.

(For Additional Prices See Page 970)

Pig Iron Sales Continue to Grow

Producers More Freely Book Orders Both for This Year and Next at Government Prices, Subject to Awaited Differentials—Eastern Sales Total 200,000 Tons—1918 Ferrosilicon and Silvery Schedules Announced

Philadelphia, Oct. 29.—Sales of pig iron in this district during the past week totaled fully 20,000 tons. The largest single transaction was in steelmaking iron, while the remainder of the week's business involved mainly foundry iron. Numerous furnaces now are selling for shipment beyond December, so that the larger portion of the foundry iron sold during the week is for first half shipment. All of this business went on the basis, of $33, furnace, for No. 2 plain, $33.50 for No. 2X, and $34.50 for No. 1X, subject to correction in case the war industries board refuses to accept these differentials. First half sales are being made on the same basis as for delivery this year; in very few cases have the prices done been made subject to revision, in accordance with any change of government price Jan. 1. Among current inquiries is one for 200 to 300 tons of foundry for the Southern railroad. Current inquiry is active and involves nearly all grades. The government is distributing a few small tonnages, mainly steelmaking iron. These are for consumers who are turning out castings for the government. The inquiry for 6000 tons of bessemer for an eastern consumer, reported last week, has not been closed.

Boston Market Halts

Boston, Oct. 29.—The pig iron market in this district is halting and the trade is very much at sea over the matter of differentials. The present government basis of $33 f.o.b. furnace for No. 2 foundry, with silicon at $1.75 to $2.25, figures out on the basis of present differentials $35, delivered this territory, for eastern Pennsylvania, $36.10 for Buffalo and $36.25 for Virginia. If these differentials are adopted and maintained it is evident that eastern Pennsylvania iron will hold the competitive advantage. The market, though not absolutely sold out, is fairly well cleaned up and lately there has been a growing interest on the part of buyers. The complaint is common of slow delivery of iron on local contracts; this is explained by the fact that the furnaces everywhere are not only receiving short shipments of coke, but fuel of an inferior quality, which results in an abnormal percentage of low-grade product. The prospect of immediate improvement in this direction is considered remote. There is no inclination on the part of the sellers to contract beyond the first of the year.

Differentials Hold Up Buying

New York, Oct. 30.—Continued delay of the government in announcing grade differentials is holding up demand for low phosphorus iron in this district. Although a few sales have been made since Sept. 24, either at the suggested price on low phosphorus, subject to correction in case this was not accepted, or with the price to be fixed later in accordance with the government figure, these have involved only small tonnages. The majority of consumers have been disposed to wait for final action. In the meantime, stock piles are being eaten away and consumers are nearing the time when they will have to buy. Some inquiries are out, the largest being one for 2000 tons for this year. Most of the business this week has involved foundry iron and totaled several thousand tons, both for this and next year. All this business was taken at $33, furnace, for No. 2 plain and $33.50 for No. 2X, subject to the

final differentials. Sales for next year usually are being made on the same basis as for this year, but are not made subject to any change of government prices Jan. 1. Several inquiries for malleable are out, including 1000 tons for next year to a New York state consumer. A lot of 800 tons of No. 2 is wanted by the Worthington Pump & Machinery Corp. for Elmwood Place, Cincinnati, for November-February delivery. No action has been taken by the national council of defense on the big tonnage of bessemer for the Italian government which has been under negotiation.

Inquiries are Numerous

Pittsburgh, Oct. 30.—Blast furnace interests are receiving numerous inquiries for iron, mostly for last quarter shipment. Producers, however, are well committed for the remainder of the year and are closing for only limited tonnages. The free movement of iron which followed the announcement of government prices having been checked, it is improbable that it will be resumed until after levels have been established on additional grades. A valley furnace has sold a Pittsburgh consumer 3000 tons of No. 2 foundry at the tentative figure of $33, furnace, for last quarter delivery. A purchase by a valley interest of 300 tons of off-basic iron at $32.50, furnace, also is reported.

More Sales at Buffalo

Buffalo, Oct. 29.—More activity was apparent in the pig iron market this week and the buying almost could be characterized as brisk. Placements were more frequent and of larger total than for some time past, in fact since the middle of the summer. Inquiry was very fair during the week and in the case of one furnace running on pig iron instead of ferromanganese, this could be well taken care of. This furnace during the past week disposed of 6500 tons of iron of which 1000 was basic and 5500 No. 2 plain. The price was according to the government schedule. Another tonnage of 2000, foundry grades, was sold during the week by a furnace which is not particularly seeking business, but is endeavoring to supply old customers. Tonnage in all grades is limited. Furnaces that are in a position to sell prefer to confine their offerings to prompt shipment and over the balance of this year. While some sales have been made for 1918 delivery, the furnaces do not care to sell until government action on prices for that period is definitely known.

Foundry and Malleable Scarce

Cleveland, Oct. 30.—Insistent inquiries for pig iron are reaching producers in large numbers. The demand is largely for foundry grades. Some producers who have been selling rather freely since the situation was partially cleared by the government's price announcement, find themselves with little tonnage unsold. Buyers are willing to contract through the first half. Malleable is scarce. It is understood here that some of the delay in announcing differentials on pig iron, results from an inability to determine suitable prices on the specialties. The new tax on transportation, which becomes effective Nov. 1, will result in an additional cost to the consumer and some requests have been received for the producers to prepay iron shipped during the last few days of this month. The Emergency Fleet corporation has bought some additional tonnage of foundry iron on its recent inquiry for 20,000 tons. Several thousand tons of basic have been taken by the Whitaker-Glessner Co., Portsmouth, O. Some Virginia iron has been sold in this territory, largely high silicon and high manganese and this represents about $40, delivered. Some eastern producers of low phosphorus have sold several thousand tons into western territory at $55, furnace. Sales of Tennessee foundry iron in northern Ohio during the past week involve a lot of 1000 tons for December, and a lot of 2000 tons for first half, at $33, furnace. A sale of 600 tons of 8 per cent silveries was made at $46, southern furnace. The demand for iron for November and December delivery is large.

Southern Rates Rise

Radical advances became effective Oct. 24 in rail and water transportation rates on shipments of pig iron from Birmingham to New England and other eastern points. The new rail and water rates from Birmingham are as follows:

Boston	$6.00
Providence	6.00
Fitchburg	6.40
Holyoke	6.40
Lowell	6.40
Lynn	6.40
Taunton	6.40
Phillipsdale	6.70
New York	5.75
Philadelphia	4.80

Chicago Inquiry Increases

Chicago, Oct. 30.—Increased inquiry for pig iron, particularly basic and malleable, is being received by local makers. Demand for the former is in larger volume than can be satisfied for either this year or for the first half of 1918. Selling against the production of the new Iroquois stack from February to July continues. Government demands for iron for immediate delivery to melters getting out material for gun mounts and ship fittings have begun to come out and more is expected to follow. This complicates the delivery situation further. A local steel works stack has sold about 2000 tons of bessemer for malleable users, 1917 delivery, at $36.30, furnace, a differential of 10 per cent over foundry iron. Need for more iron than is being delivered is shown by the inquiry for prompt delivery and also by requests for anticipation of 1918 contracts. The latter has been found impossible under present circumstances. Lake Superior charcoal iron is being quoted at a range of $35.50 to $37.25, furnace, for the several silicon analyses, with $2 freight to Chicago. Inquiries for about 3500 tons are active. Sufficient sales have been made to establish this price. Jackson county producers of silveries have announced prices for 1918 delivery at $40 for 6 per cent, with $3 additional for each point of silicon to 9 per cent and $3.50 per unit of silicon above that mark. Bessemer ferrosilicon is quoted for 1918 delivery at $57.50 for 10 per cent and $4 additional for each unit of silicon above that content. Southern makers seem more willing to sell for this year and first half of next year. A recent sale involved 500 tons for this year at $33, furnace, for 1.75 silicon and over.

Some Southern Sales Made

Cincinnati, Oct. 29.—Market reports in pig iron of late have become almost an endless repetition. Uncertainty as to government action on price differentials and for the future continues to hold back the market. Some foundry iron for this year has been bought at $33, Virginia and southern furnaces. Freight differentials do not seem to have any influence. The shortage of iron in the south as well as in the Ironton district prevents competition between furnaces on business at points which have advantages in freight rates. Although the inquiry for first half iron is good there is no disposition on the part of the producers to book orders for that delivery beyond a few medium sized lots that customers insist on taking. Unless the analysis of the iron showed it to be special, the price of $33 at furnace is inserted in all No. 2 foundry contracts. The coke situation is giving a number of southern furnaces some uneasiness and it is also partly responsible for operators there refraining from making first half promises. The market is at a wavering

point where almost any change might bring out first half buying in a comparatively large volume.

Inquiry is Heavier

St. Louis, Oct. 27.—Somewhat more disposition is being shown on the part of consumers to cover their requirements for pig iron. The past week has developed numerous inquiries, most of them for small amounts, but in the aggregate they represent a considerable tonnage. Most of the inquiries call for distant delivery. The response by dealers and producers has not been proportionate to the demand. Southern furnaces, which mainly supply this district, are positively indifferent. They are booking little business and declare they will not change their policy until differentials are determined and the air generally is cleared. "Our position," said the representative of a large Birmingham producer, "is a waiting one. It will take our entire normal production to supply iron on our contracts, and these run well into next year. We could easily sell at higher than the $33 price and have customers wanting to pay more. This we will not do, and all things now strongly emphasize the wisdom of sitting tight." Brokers handling northern iron report slightly more liberal offerings and some business in small lots. The coal situation in this district has cleared up, and plants threatened with curtailment have resumed capacity production.

Southern Makers are Selling

Birmingham, Ala., Oct. 30.—Southern pig iron producers have been selling some iron lately at the government prices. It is stated that in almost each instance a regular customer was accommodated and practically spot iron was disposed of. It has been taken for granted here that the same differentials which existed before the government price schedule was announced are to be continued and sales are being made on that basis. The aggregate business so far transacted has been limited. Old contracts are being worked on steadily though delays still are reported in deliveries and representatives of consumers remain here watching shipments. Stocks of iron in the southern territory show no diminution. The Shelby Iron Co. has one furnace on charcoal and the other on foundry. The Birmingham Trussville Iron Co. will have its Trussville furnace in operation within the next 10 days. The Alabama Co. is pushing the work of repairs on its Ironton furnace. Many inquiries are being received for iron, but not until the old contracts are nearer expiration, no strong effort is likely to be made to book business. There is a belief that northern and eastern furnaces are accumulating orders for 1918 delivery so that southern producers may be obliged to compete for business.

Makers of silveries and bessemer ferrosilicon irons have announced prices at southern Ohio furnaces, at which they will accept business for 1918, the figures being tentative and subject to revision by the government. The prices announced by makers for silveries are as follows: Six per cent, $40; 7 per cent, $43; 8 per cent, $46; 9 per cent, $49; 10 per cent, $52.50. Quotations for bessemer ferrosilicon are as follows: Nine per cent, $56.50; 10 per cent, $57.50; 11 per cent, $61.50; 12 per cent, $65.50, and 13 per cent, $69.50. These figures represent reductions of from $6 to $8 from prevailing levels.

Sell Coke at Fixed Price

Limited Quantities of Furnace Fuel Go at $6, Ovens—St. Louis Sells at $8.95—Foundry Orders at $7, Ovens

Pittsburgh, Oct. 30.—Limited tonnages of spot coke are being accepted by operators in the Connellsville regions, particularly the larger ones, at the government price of $6, ovens. This business is being done quietly. It is understood that small operators continue to decline prompt business but instead are devoting their operations to contracts which were closed at the high open market quotations that prevailed before the government fixed a price on fuel. Blast furnaces and foundry interests are complaining strongly that they are unable to cover their requirements and the latter are said to be especially short of coke. Producers are anxiously awaiting for the government to establish a differential on foundry coke which they think will be done. Another cause for complaint by furnace consumers is that tonnages of coke shipped are irregular and below standard quality, being extremely high in phosphorus. It is also claimed that the coke is being loaded into cars in an indifferent manner. The recent order of the priority board giving a 100 per cent coke-car supply has not improved shipments much. The supply of cars lacks uniformity and last week ranged from 30 to 90 per cent, the average being approximately 70 per cent. The production of coke in the Connellsville region for the week ending Oct. 20 was 346,239 tons, as compared with 339,002 tons for the previous week, according to *The Connellsville Courier*.

Get Some Fuel at $6

Philadelphia, Oct. 29.—Some relief has come to eastern Pennsylvania pig iron makers who have been short of coke. A few furnaces requiring hundreds of tons of furnace coke have managed to obtain a few cars. This business went at $6, Connellsville ovens, so that the market in this district has become established to this extent at that figure. In foundry coke the only developments of the week were comprised in a few first half contracts in which the prices were left blank to be filled in later.

Serious Situation at Buffalo

Buffalo, Oct. 29.—The coke situation in this district is serious. Furnaces and companies requiring coke for heating purposes are unable to find even single carload lots. The hope of the furnace interests rests on government action on the different grades soon. Most of the coke companies are sold up for this year but with the price situation on a definite basis, it is generally thought more tonnage will come into the market.

Sell Foundry at $7

Cleveland, Oct. 30.—Some sales of Connellsville foundry coke have been closed by certain producers with consumers in this territory on a tentative basis of $7, ovens, subject to the final government price on this grade. After having disposed of considerable tonnage, these makers have withdrawn from the market.

Foundry Fuel is Wanted

Cincinnati, Oct. 29.—The inquiry for foundry coke is scattered, but the total tonnage wanted is important. Sales agencies are unable to take on any business, except in a few cases where there is practically a swapping of cars due on old contracts. The Connellsville producers are taking practically no new business at $6, ovens, as they claim they are unable to make deliveries on time and also that manufacturing costs prohibit them from accepting orders at a loss. The labor shortage is blamed for the output being cut down to about 75 per cent of normal in all fields, but the coal supply question also is causing trouble. The Pocahontas, New River and Wise County producers have practi-

cally no coke to offer for this year's shipment and are not taking on any business for next year.

Sells at 8.95c, St. Louis

St. Louis, Oct 27.—Some slight relaxation has occurred in the rather tense coke situation. A little more surplus fuel is coming through from the east, and some tonnages under contract have been available for general distribution owing to labor troubles which temporarily are tying up smelting plants. Deliveries on contract are reported satisfactory and borrowing has enabled certain foundries to get through the period of scarcity. The eastern ovens are not quoting or booking for any delivery. The principal producer in the St. Louis district, the Laclede Gas Co., reports fairly liberal sales on a basis of $8.95, ovens. This is equivalent to $6, Connellsville, and a heavy tonnage on this basis has been shipped by the company to customers in the Chicago district. Something over 3000 tons was sold to the Missouri Cobalt Co., which will begin operating its new plant at Frederickstown, Mo., early next year. A feature of the market this week has been some inquiries for rush orders from the southwest, coming from points reaching to the Mexican border. Coke stocks in that region are said to be at the vanishing point.

Southern Production Heavy

Birmingham, Ala., Oct. 30.—The coal and coke production in the south is improving steadily and the output is greater now than it has ever been. Still there is need for more tonnage. Reports have been current that some coke has been sold at prices much in excess of the $6, Connellsville base fixed by the government but these have not been confirmed. Old contracts are being delivered. Both the coal and coke producers of this district are living up strictly to the schedules of the government but the claim is made that no coke price for this section has been provided. For that reason, it is held, a little coke could be sold at a higher price than that named. The Birmingham Trussville Iron Co. has accumulated some coke to start the furnace at Trussville. Reports have been current recently that the Gulf States Steel Co. has purchased the properties of the Sayre Mining & Mfg. Co., including mines and 150 coke ovens, now being operated by the Sloss-Sheffield Steel & Iron Co. under lease. The Sayre company's properties are located in the western part of Jefferson county, Alabama.

Will Allot Shell Tonnage

Makers About to Receive Portion of 1,500,000 Tons for Army —Tonnage for Allies Also to be Placed

New York, Oct. 30.—Shell steel manufacturers expect to receive within a few days their respective allotments of the 1,500,000 tons army shell steel order, which will be distributed through the American Iron and Steel inistitute general committee. This distribution was referred to by THE IRON TRADE REVIEW in last week's issue, but was delayed owing to the minor details connected with the contracts and the readjustment of the tonnages. The order has been subdivided and calls for between 1,250,000 to 1,450,000 tons of shell body steel to be used for shells ranging from 0.4 inch to seacoast size; between 40,000 to 50,000 tons of cold rolled steel to be used for fuses; and between 4500 to 5500 tons of deep drawing steel to be used for adapters. Shipments of the aggregate order will be at the rate of between 200,000 and 225,000 tons monthly. At the same time the large order is placed, it is expected the institute committee also will distribute between 100,000 and 125,000 tons of shell steel which will be used for 4.2 and 6-inch shells. This order was placed by one of the allied governments.

Consumers are Inquiring

Pittsburgh, Oct. 30.—Inquiries for billets and sheet bars are coming to producers from domestic consumers. It is the policy of makers, however, not to sell except in isolated cases where limited lots go to regular customers. One inquiry involves 3000 tons of 4 x 4 open-hearth billets for export. It is understood that this tonnage is for the Italian government. Producers are committed heavily on contracts and therefore have practically no free tonnages. With the filling of contracts, however, it is believed, there will be a free movement of billets and sheet bars at the fixed prices of $51 and $47.50, respectively. Inquiries for wire rods are limited, although it is reported small tonnages have been sold at the government price of $57.

Prepare to Place Shell Steel

Cleveland, Oct. 30.—Local producers of large rounds have been asked by the American Iron and Steel institute to indicate what portion they are in a position to supply of the large shell steel requirements of the army soon to be distributed. The government has placed some lots of shell steel which are to be delivered to local munition makers. One of these calls for 2000 tons for 8-inch shells. An important Cleveland consumer is inquiring for his first half requirements of billets. No transactions in sheet bars are reported.

No Prompt Strip Business

Pittsburgh, Oct. 30.—Practically no new business is being taken by manufacturers of cold rolled strip steel from domestic consumers. Specifications against contracts are light. While manufacturers have been of the belief up to recently that the government would fix a price on this product, there is now an uncertainty as to whether this will be done.

Forging Steel Sells at $95

Philadelphia, Oct. 29.—Numerous inquiries are out from domestic consumers for semifinished steel but none of the mills are offering. It is understood that a little tonnage has been taken by some mills for regular customers and on this business the government prices are said to have been done. The only definite sale reported this week was of a round tonnage of forging billets which went at $95.

Discuss Prices

Of Tin Plate for Next Year at Washington Meeting

Pittsburgh, Oct. 31.—Manufacturers of tin plate are discussing the matter of a fixed price at a meeting in Washington today with the war industries board. It is understood the government wants the price to apply throughout the year 1918. In order to do this, producers must know the government price of sheet bars for that period. The figure of $51, Pittsburgh, was named for the remainder of the present year only, but it does not seem unlikely that this level also will be maintained for 1918. Immediately after the government has fixed a price on tin plate producers will open their books for new business, but it seems probable that tonnages that can be allowed to domestic consumers will be considerably below their normal requirements, owing to the heavy demands from the government. The market continues quiet, with small domestic tonnages being taken by the independents, generally at $10, Pittsburgh.

Scrap Showing Some Life

Buying Movement Looked for in Different Districts—Price Recommendations to Government Rejected as Too High

FOR COMPLETE SCRAP PRICES SEE PAGE 970

Chicago, Oct. 30.—Better feeling prevails in the Chicago scrap market and consumers have begun to inquire more freely. The expectation of many observers is that buying may be expected to start soon. As a result, some grades of scrap have advanced slightly and the whole market is on a little higher level. It is indicated that the waiting policy on the part of consumers, in the expectation of prices fixed by the government, has been continued too long and that it has become necessary to look out for further supplies. The trade is still in doubt as to what the government may do on scrap prices. The Chicago, Milwaukee & St. Paul offers 1100 tons and the Chicago, Burlington & Quincy 2150 tons.

Boston Market Quiet

Boston, Oct. 29.—The local scrap market is not doing much as the trade is looking for some action before long by the government with regard to the fixing of prices. Pending this action, dealers, both large and small, are merely marking time. Boston is not a consuming or distributing market in the sense that the Philadelphia, Pittsburgh and Buffalo markets are, and the prices quoted here are what dealers are paying for supplies and not at what they are selling. Wholesale dealers are paying per gross ton f.o.b. care shipping point as follows:

Wrought No. 1, long, $29 to $30; horseshoes, $29 to $30; cotton ties, $20 to $21. stove plate, $19 to $20; No. 1 machinery, $33 to $33.50; No. 2 machinery, $28 to $29; car axles, steel, $42 to $44; car axles, iron, $49 to $50; rerolling rails, $37 to $38; iron boiler plates, $34 to $35; bundled barrel hoops, $17.50 to $18; wrought iron pipe, $24 to $25; steel rails, $25 to $26; No. 1 railroad steel, $25 to $26; heavy melting steel, $24 to $25; axle turnings, $18 to $19; machine shop turnings, $15 to $16; cast borings, $17 to $17.50; drop forge trimmings, $21 to $22; cast iron car wheels, $30 to $32.

Steel Sells at $26.50

Philadelphia, Oct. 29.—Among sales in the scrap iron and steel market in this district this week was one of 1000 tons of No. 1 heavy melting steel at $26.50, delivered eastern Pennsylvania. This is the biggest transaction here for some time, which is a fair indication of how dull the market has been. Some small lots of wrought scrap were sold during the week. Foundry grades are stagnant. Prices are unchanged. The trade continues to wait for an announcement establishing government prices on the principal grades.

Pittsburgh Market is Quiet

Pittsburgh, Oct. 30.—Quietness continues to prevail in the scrap market in this district. The largest tonnage of heavy melting steel that has been sold recently went to a consumer in the Mahoning valley at $29, which appears to represent the market for that grade. Buyers apparently are withholding purchases until they have assurances as to whether or not the government will fix prices.

Buying Movement Expected

Buffalo, Oct. 30.—The market at the present time is standing still but before the end of the week, a buying movement is expected by dealers here. This is due to a belief that there will be a decision by the government in the matter of the price of scrap steel. Although dealers believe it is still an open question, there is a feeling that the government will not name a price but will leave the matter to adjust itself. Already there is noticeable a trend towards lower levels. Steel has dropped from $28 and $30 to $27 and $28; No. 1 railroad wrought from $37 and $38 to $36 and $37; No. 1 railroad and machinery cast from $28 and $29 to $27 and $28; machine shop turnings from $17 and $18 to $16.50 and $17; cast iron borings, from $19 and $20 to $18 and $19; low phosphorus, from $41 and $42 to $36 and $38; old iron rails from $38 and $39 to $37 and $38. In the meantime no sales of any size have been made. Conditions in regard to the securing of open cars and transit facilities coupled with labor conditions are acute.

Producers Anxious to Sell

Cleveland, Oct. 30.—Iron and steel scrap producers in this territory appear to be anxious to dispose of their accumulations almost at any price, according to dealers. Among these producers are quite a few who held onto their material past the days last midsummer of $47.50 heavy melting steel. As a result scrap is plentiful in this market. Consumers, however, are quiet. Based on dealers' inquiries among consumers the following items are from 25c to $1 softer: Bundled sheets, hydraulic pressed sheets, steel rails over 6 feet, both for melting and rerolling, axle turnings, steel axles, stove plate and grate bars.

Still Wait on Government

Cincinnati, Oct. 29.—Dealers are so uncertain about what action the government will take in the regulation of prices that they are still holding off and are neither buying nor selling any scrap except in small quantities. The foundries, as well as the rolling mills are melting more scrap than usual, but are only using supplies on hand or those previously bought. No quotations have been changed as transactions made in the last few days do not justify the naming other than nominal prices.

Market at Standstill

St. Louis, Oct. 27.—The market for iron and steel scrap continues at a standstill. Aside from relaying rails, which are in excellent demand and relatively strong, no interest is manifest in any grade. Views of consumers differ radically from those of dealers and both appear content to let matters drift until definite information comes from Washington. The opinion prevails among dealers to a large extent that the government will use heavy melting steel as a base and place a price of $30 upon that grade. Consumers, on the other hand, think that $25, or even slightly lower, will be the basic figure. Consumption, meantime, continues unabated. The larger mills and other consumers, including the stovemakers, are cutting heavily into their reserves.

Southern Scrap Unsettled

Birmingham, Ala., Oct. 30.—The iron and steel scrap market in southern territory remains unsettled. There is plenty of stock in hand and inquiries are coming in steadily, but consumers are willing to buy apparently only as they need material and then fix their own prices. Further reductions in quotations have been made and weakness still is noted. Consumers are buying heavy melting steel but are making their own price, and $20.50 now is considered a high figure.

Pittsburgh Buys in East

New York, Oct. 30.—Several thousand tons of heavy melting steel have been purchased here during the past week for the Pittsburgh district. This business was placed at $28, Pittsburgh, equivalent to $25 to $26, New York. These sales were practically the only activity of the market. Other grades of scrap showed no change.

Seeking 1918 Bar Contracts

Many Consumers Now Endeavor to Cover Future Requirements —Some Reservations Are Made—More Sales at 2.90c

Chicago, Oct. 30.—Although the government has placed considerable tonnage of finished steel products during the past week, this business has been somewhat less than expected. Included in the steel for construction of destroyers is some tonnage of bars, but this has not yet been distributed. Notice has been sent out by the American Iron and Steel institute, stating that the army ordnance needs between now and Sept. 1, 1918, will include 1,500,000 tons of shell steel from 2 to 11½ inches in diameter, rounds and round corner and gothic billets. Mills are asked to designate their ability to furnish various sizes and sections in this range. Bar iron continues to be quoted at 4.50c, Chicago mill. Additional demands are expected soon from builders of escort wagons for the army. Other demand is not heavy. Hard steel bars continue at 4.25c to 4.50c with small demand. An inquiry for about 2000 tons for concrete reinforcement has been withdrawn.

First Sale at Agreed Prices

Philadelphia, Oct. 29.—Although inquiries continue to come out for steel bars for regular domestic consumption over the first half, none of this business is being booked. Only one sale of soft bars was made during the week at 2.90c, Pittsburgh, and this was the first sale of this kind. Further sales of concrete bars, however, were made at 2.90c. Numerous sales of iron bars, especially to shipyards, are reported at 4.50c to 5c. A small tonnage of machinery steel bars was sold here during the week at 5.50c, Pittsburgh.

Selling Regular Customers

New York, Oct. 30.—The steel bar market in this district gradually is becoming established at the 2.90c, Pittsburgh, price on actual business. Several sales at this base have been made during the past week. In all cases, however, they have been made by mills to regular customers. It is understood that in several cases reserations of tonnages for first half for regular customers, have been made by leading mills at this price. Numerous additional sales of concrete bars have been made at 2.90c, Pittsburgh.

More Sales at 2.90c

Cleveland, Oct. 30.—Buyers of steel bars are inquiring more freely for contracts covering their requirements for the first quarter and the first half of 1918. Some business has been accepted by the mills at 2.90c, Pittsburgh, for delivery at their convenience. Some buyers report they are able to place contracts through the first half at this figure. A Toledo consumer who is figuring on 10,000 tons for the first half has placed 2000 tons. A local consumer is inquiring for from 3000 to 4000 tons of various classes of bars. Reports are current that a valley producer who recently put in new capacity has been taking considerable bar business. Some makers of reinforcing bars still continue to quote from 3.75c to 4c, mill.

See Only Small Amounts

Pittsburgh, Oct. 30.—While inquiries for soft steel bars are coming out, mills are well booked and are not in a position to accept new business where large lots are involved. Small tonnages, however, are being taken from stocks for regular customers. The inquiry for hard steel bars is limited. Considerable activity prevails in the bar iron market and tonnages have been sold to domestic consumers during the past week at 4.50c to 4.75c, Pittsburgh.

Some Shafting is Sold

Pittsburgh, Oct. 30.—Small tonnages of shafting have been sold during the past week by producers in this district who are able to take new prompt business for certain sizes. Mills are extremely busy and are from three to four months behind on contracts. The market is quotable at 10 off.

Cotton Tie Season Closed

Pittsburgh, Oct. 30.—The season for cotton ties is closed and no new business in this market is being done. The October price for cotton ties is $2.14, Pittsburgh, and the November price, $2.15, which allows for the storage charge of one cent per bundle a month.

Nuts, Bolts and Rivets Firm

Pittsburgh, Oct. 30.—Although there is a small leeway in prices, the market for nuts, bolts and rivets is fairly firm. Mills are operating heavily on contracts, but continue to be able to close for some new domestic business. Some producers are between three and four months behind on contracts. Manufacturers have no information as to what the government may do in the fixing of prices. They report that they have been able to obtain steel at government prices where the material is to be used for government requirements. Aside from this they have obtained no steel, except on contracts placed before bar prices were fixed.

Hoop Tonnages Sold Up

Pittsburgh, Oct. 30.—Fair-sized tonnages of hoops have been sold during the past week for prompt delivery at 6c, Pittsburgh. The market for hoops, which is extremely quiet, is quoted at 5.85c, Pittsburgh.

Renewed Life

In Store Business at Boston and Elsewhere—Quoting at Warehouse

Boston, Oct. 29.—Warehouse business, which fell off early in September and continued quiet pending the announcement of the government price schedules, lately has been showing constant though gradual improvement. The more important local jobbers now state that the tonnage compares favorably with that early in the year. There has been quite a general mark-down in quotations, but the market is in nowise weak, the new quotations being merely in keeping with the prices fixed by the government. Warehouse stocks are reported to be badly broken in most lines and as the mills are not eager to book new business at the fixed quotations, there is some concern about future supplies. Sheets are not selling with much vigor, for since they were not included in the government revision of prices, there is a belief among consumers that reductions may be expected. Warehouse quotations follow:

Plates, narrow, 8.50c; plates, ship, 11.50c; Structural shapes, 6.50c to 7.50c; Steel bars, 5.50c; iron bars, 5.50c; No. 28 blask sheets, 8.70c to 10c; No. 28 galvanized sheets, 9.70c to 12c; No. 10 blue annealed, narrow, 8.60; No. 10 blue annealed, wide, 10.60c.

Quote on Warehouse Basis

Buffalo, Oct. 29.—The leading steel distributor has announced that warehouse prices henceforward will be f.o.b. warehouse, except for truck delivery, instead of f.o.b. Buffalo, as has been the case. A similar change has been made by this interest in other districts. This company is only accepting specifications on account of existing contracts taking on no new business nor taking no new contract for future specification.

Big Ship Tonnage Placed

Thirty Fabricating Shops to Receive Orders for 69,000 Tons—More Demand for Structural for Commercial Projects

New York, Oct. 31.—Fabrication of steel required for government freighters to be built by the Submarine Boat Corp. has been arranged. A list of 30 or more shops which will fabricate this steel has been submitted to the government and priority certificates to insure prompt shipment of steel have been granted. The contracts let call for 69,000 tons of fabricated steel for boats and 10,000 tons for buildings at Port Newark terminal. All deliveries are to be completed before April, 1918. Application for priority certificates for the steel for the American International Shipbuilding Corp. has been made but has not yet been granted since the arrangements for the fabrication have not been concluded. It is estimated that in addition to 121,000 tons for vessels, the American International will require 10,000 to 15,000 tons for plant construction.

Orders Still Pending

Philadelphia, Oct. 29.—No awards yet have been made of the tonnage of fabricated steel which the American International Shipbuilding Corp. will need for building 50 steel freighters for the government. In fact, the stage of receiving bids on the fabricating has not yet been passed, since the fabricators need much more data than was contained in the shipbuilding corporation's original inquiry. This and other direct or indirect government tonnage represents most of the business pending in the structural market in this district. Among new jobs up is a large machine shop for the Washington navy yard requiring 2000 tons. Sales of plain shapes at the 3c price again were made by one eastern mill during the week. This interest took a number of small tonnages, both standard and special sections. One small mill sold a round tonnage of shapes at 5.50c, Pittsburgh, for domestic use.

Shops Decline Private Orders

Pittsburgh, Oct. 30.—Orders placed directly by the government or by consumers engaged on government contracts represent practically the only business being closed by fabricators. Commercial operations already greatly curtailed, owing to the inability of obtaining shapes, may be reduced further. Fabricators are well booked for the remainder of the year and are compelled to decline to take tonnages for domestic consumption. The Sharon Steel Hoop Co. has placed 2000 tons with the American Bridge Co. for extensions to its open-hearth plant at Youngstown.

Building Prospects Better

Chicago, Oct. 30.—Although nothing of importance in a structural way has been placed in the west recently, some tonnages of unusual size promise to come out shortly. The Chicago & Northwestern railroad has asked bids on its bridge requirements for next year, involving 3000 to 4000 tons. The heaviest tonnage now in prospect involves 7000 to 9000 tons of structurals for a warehouse for Butler Bros., Chicago, upon which bids are being asked. Fabricators are booking a moderate tonnage in unusually small tonnages and some have sufficient business to last them for three months. Shops are not busy, but they are expecting they will receive orders shortly to proceed with fabrication of steel for the emergency fleet.

CONTRACTS PLACED.

Machine shop and other additions for the Watertown arsenal, Watertown, Mass.; 1350 tons; to the Ferguson Steel & Iron Co.

Warehouse in France for the United States government; 500 tons; to the Ferguson Steel & Iron Co.

Bridge work for the Pennsylvania Lines West; 1000 tons; to the American Bridge Co.

Additions to Watervliet arsenal, Watervliet, N. Y., 2500 tons to Belmont Iron Works.

Additions to Watertown arsenal, Watertown, Mass., 3500 tons to Eastern Bridge & Structural Co.

Extensions to plant of General Electric Co., Lynn, Mass., 1000 tons to independent shop.

CONTRACTS PENDING.

Machine shop for Washington navy yard, 4000 to 5000 tons, bids being taken.

Bridge for Pennsylvania railroad, 400 tons, bids being taken.

Buildings for Langley aviation field, Old Point Comfort, Va., 6000 to 8000 tons, bids being taken on part of this tonnage by J. G. White Engineering Corp.

Chicago & Northwestern railroad bridge requirements for 1918, 3000 to 4000 tons, bids being taken.

Warehouse, North Canal street, Chicago, for Butler Bros., wholesale grocers, 7000 to 9000 tons, bids being taken.

Addition to plant of Philadelphia Electric Co., Philadelphia, 4000 tons designed chains to reinforced concrete.

Mills Book Plates at 3.25c

Bethlehem, New Entry in Market, and Other Eastern Makers Accept This Figure—Allot Steel for Ship Fabrication

Philadelphia, Oct. 29.—Sales of several thousand tons in this district during the past 10 days mark the Bethlehem Steel Co.'s entry into the plate market for the first time in its history. This business, which was booked at the government base price of 3.25c, involves the first output of the new 110-inch plate mill which the company recently placed in operation on part schedule. It is understood that bookings so far have been restricted to government work, either direct or indirect. Another leading eastern Pennsylvania maker, who has been out of the market since Sept. 24 on all excepting government business, came into the market during the past week and booked several round tonnages of universal plates on the basis of 3.25c, mill. Several of the smaller eastern makers continue to ask higher than the government price and have booked a number of round lots at 6.50c to 7.50c, Pittsburgh. General domestic demand has been of larger proportions during the last week than for some time past. The bookings, as reported above, constituted only a small portion of the inquiry, however.

Sell Universals at 3.25c

Cleveland, Oct. 30.—A number of sales of universal plates for shipment this year have been made in this territory at 3.25c, eastern mill. Tank steel, however, is difficult to obtain at the government price. Local makers are quoting from 6 to 6½c, mill, for light plates and higher for the heavier gages. An eastern maker has been naming 7.50c, mill, for ealy tank steel. Inquiries for 40 portable boilers for cantonments are pending.

Ship Steel is Placed

Chicago, Oct. 30.—A preliminary order for 3000 tons of plates and shapes to be furnished fabricating shops in this territory has been placed by the Emergency Fleet corporation with an independent maker. Information is that this tonnage will be increased largely as fabrication for the ship program gets well under way. Steel for destroyers also has been placed and includes considerable high-silicon plates and shapes, which are somewhat difficult to produce, and will interfere with rolling schedules.

Car Contracts Not Placed

Pittsburgh, Oct. 30.—The government continues to withhold the placing of contracts for the 10,000 cars for which it recently put out an in-

quiry. It is understood that this order will be placed in the near future. The government has also deferred final action with regard to the reletting of 27,500 eight-wheel narrow gage cars for Russia. Plate mills continue to receive allotments from the government which, with the heavy tonnages they already had booked, keep them operating at capacity. No tonnages of consequence are being sold to domestic consumers. The small lots that are going to this trade come from stocks principally and are being sold at the government price of 3.25c, Pittsburgh.

Easier Prices in Sheets

Bring Out More Business and Makers Book Freely—Begin to Doubt Government Will Fix Formal Schedule

Pittsburgh, Oct. 30.—The market for sheets continues to grow easier and as a result there has been an increased number of inquiries for domestic consumption and additional business for last quarter delivery has been taken. Small tonnages of both blue annealed No. 10 and black No. 28 are reported to have been sold at 6c, while a limited lot of No. 28 galvanized is said to have been sold at 7.50c, all for prompt shipment. It is reported that some offerings have been made even lower. Sheet manufacturers met today at the William Penn hotel, Pittsburgh, and it is understood discussed the government price situation. Some producers are of the pinion that the government will not fix a price on sheets, but will allow the trade itself to regulate this matter through the sheet committee of the American Iron and Steel institute. One reason for believing that the government will not fix a price is that wages of sheet workers are based on prices. By reducing the existing levels, this would mean less wages and, therefore, would be direct conflict with the announced policy of the government that wages shall not be reduced.

Eastern Demand Drops Off

Philadelphia, Oct. 29.—Among surprising developments here has been the falling off of demand for sheets. Inquiries now are not nearly as numerous as a while back, and it is rare that one of them involves more than 50 tons. Business of the past week, therefore, was small. Sales of both black and blue annealed sheets were made at 6½c to 7c, Pittsburgh, while galvanized sold at around 8.50c. No announcement yet has been made as to the government price.

Buyers Come Out Freely

Youngstown, O., Oct. 31.—No large tonnages of any grade of sheets have been disposed of the past week in this territory. Sales managers state that buyers are coming out more freely and if all inquiries were satisfied the mills would be sold up into 1918. Reports are current that some mills are offering various grades of sheets at prices to be deferred until the government figures are announced, although no actual sales have been recorded on this plan. No exact quotations can be given at this time, owing to the unsettled price-fixing condition, although 6c for No. 10 blue annealed, from 6c to 6.50c for No. 28 black, and from 7.50c to 8.50c for No. 28 galvanized would closely represent the market. Sheetmakers look for an early settlement of the sheet prices. It is contended that a fair profit will be allowed to nearly all sheetmakers in this territory if the price is set between 5c and 6c for No. 28 black. Buyers of sheet bars are fairly well covered for this quarter, which accounts for the quietness noted in that product. Few bars are being offered either from makers in this district or from outside. The leading maker has about closed his books for this quarter's business.

More Business Closed

Cleveland, Oct. 30.—The sheet market continues to develop a variety of prices, usually on a lower basis, which have brought out considerable new business. Some producers as a result have booked themselves full to the end of the year, or beyond, and consequently are less inclined to shade. Certain mills have been showing a desire to clean up stocks and this has brought out some low prices. In one instance a quotation of less than 5 cents, mill, for No. 28 black is reported. Quotations generally are around 6c, mill, for No. 10 blue annealed and No. 28 black, and 7.50c for No. 28 galvanized. Buyers show more willingness to enter into contracts for the first quarter.

Prices Still Soften

Chicago, Oct. 30.—Prices on steel sheets continue to be lowered and at present quotations are approximately where it is expected government prices may be placed. Announcement of fixed prices is expected at any time. Buyers have been offering contracts to be filled in at government prices but these have not been accepted as most makers prefer to name a definite figure. Present quotations on No. 28 gage black are about 6.215c to 7.215c, on No. 10 gage blue annealed 5.715c to 6.215c, and on No. 28 gage galvanized 7.715c to 8.215c.

Boston Reports Added

With this issue of THE IRON TRADE REVIEW begins the publication of weekly market reports from the Boston district. That territory scarcely has received the attention in iron and steel market reporting that its trade importance warrants. Boston is an important distributing center for pig iron, especially foundry grades. Its distant location from the mills also has made it a great warehouse district. The tonnage of scrap which is marketed at Boston for outside distribution is large. These three lines consequently will be covered in the weekly market reports.

Trade Uncertain

Whether Government Now Will Fix Ferroalloys After Markets Drop

New York, Oct. 30.—While there has been no definite expression from government officials on which to base an opinion, the belief has become general that prices on ferroalloys will not be regulated. In the first place, the production of the principal one of these alloys, ferromanganese, is dependent upon ore obtained from abroad, so that price regulation would be somewhat impracticable. Then, too, it is considered that the recent radical declines in prices to levels which are considered as in accord with the general iron and steel price level, are considered as indicating that price regulation is unnecessary. If, however, price regulation is in prospect, it cannot be expected in the near future, since no definite efforts yet have been made in this direction.

Prices on ferromanganese and spiegeleisen again underwent marked recessions during the past week. The lowest price heard on ferromanganese is $250, delivered, which an eastern producer quoted on a moderate tonnage for delivery next year. The market for this year may be quoted at $250 to $275. Only a small business in the aggregate has been placed during the past week and current inquiry is attracting proportions. In speigeleisen only a small business has been transacted dur-

ing the week, but at lower prices and the market now may be quoted at $67.50 to $70, furnace. The inquiry for 12,000 tons for shipment over the whole of 1918 to Corrigan, GcKinney & Co., Cleveland, has not yet been placed. Low quotations have been made on this business. Only small scattered sales of 50 per cent ferrosilicon have been made during the past week. Weakness no longer is a feature of this product and the market for this year appears firm at $170 to $180, delivered. There have been no recent quotations for next year.

Raises Manganese Ore Offer

New York, Oct. 30.—An advance of 20 cents per unit on the prices they will pay for domestic manganese ore was made Oct. 25 by E. J. Lavino & Co., Philadelphia. That interest now is offering to pay $1.20 as its base price on domestic ore, f.o.b. its furnaces at Lebanon, Sheridan and Marietta, Pa., and Anniston, Ala. The base price applies to ore running 50 per cent and higher in manganese.

Ferroalloy Market Quiet

Pittsburgh, Oct. 30.—Prices being quoted by makers of ferromanganese vary widely and range from $285 to $325, delivered, for prompt shipment. Inquiry is extremely limited. The 12,000-ton spiegeleisen inquiry put out by Corrigan, McKinney & Co., is understood to have brought out a number of quotations, but so far as known here the contract has not been closed. Some quotations on this material range from $65 to $70, furnace, although it is believed that these figures can be shaded greatly. Some makers of ferroalloys think that prices will be fixed by the government on their products, although others express a contrary view. Bessemer ferrosilicon can be purchased at $65 for 10 per cent and $75 for 13 per cent, southern Ohio furnace, while 50 per cent ferrosilicon is quoted at from $170 to $180.

Ferromanganese is Lower

Chicago, Oct. 30.—Ferromanganese is being quoted nominally at $275, Chicago, for 1918 delivery. It is believed some makers have offered this alloy at $250, Chicago, for next year, but sales have not been noted at that figure. The local producer has been sold out for some time on delivery for this year and can offer only 1918 tonnage.

The Butler Steel Co., Hazleton, Pa., has commenced operating a steel foundry which it just has completed. The foundry is part of a large plant which has been under construction during the past year.

Russian Cars Distributed

Various Builders Receive Portions of 30,000 Purchase—More Demand From Domestic Roads—1919 Rail Inquiry

New York, Oct. 30.—Orders finally have been distributed at Washington for the 30,000 cars for Russia which have been under negotiation for several months. These cars which are to be four-wheeled and have a capacity of 15 tons to 20 tons each, have been allotted as follows: American Car & Foundry Co., 10,000; Standard Steel Car Co., 10,000; Pressed Steel Car Co., 7750; Pacific Car Co., 2250. Further orders are understood to have been placed during the past week for cars for United States military purposes in France.

Some of the western lines again are inquiring for rails for 1919 delivery. Of 6000 tons of rails to be required in equipping the huge government shipyard of the American International Shipbuilding Corp., at Hog Island, Philadelphia, now under construction, 2000 tons already have been placed with the Bethlehem Steel Co. It is likely the remaining tonnage also will be placed with this maker. For this work, Bethlehem will furnish about 175,000 tie plates. The American International Shipbuilding Corp. has put out an inquiry for 400 flat and 50 box cars.

New car inquiries are fairly numerous. The Seaboard Air Line is in the market for 500 flat cars; the Western Pacific is in the market for 500 gondolas; the Illinois Central wants 500 coal cars, and the Marion & Eastern railroad, 500 to 1000 gondolas. The Union Pacific railroad has decided to buy 150 instead of 1000 logging trucks; otherwise its original inquiry for 4750 cars, as reported last week, is unchanged. The National Tube Co.

Comb Market for Rails

Pittsburgh, Oct. 30.—Rail mills are committed on contracts throughout 1918. Domestic consumers have been combing the market for light tonnages without being able to obtain their needs. Virtually all tonnages taken by producers are directly or indirectly for war needs. Small tonnages of spikes continue to be sold.

Car Buying Improves

Chicago, Oct. 30.—Inquiry for railroad cars continues to come out and one lot, including 500 box cars for the Central of Georgia, has been placed with the Pullman Co. The United States government is about to come into the market for additional cars, the number having been set at 10,000, although this is not definite. The Illinois Central is inquiring for 1000 70-ton hoppers, and 1500 50-ton general service cars. The Chilian State railway is asking prices on 330 box cars, 230 stock cars, 200 gondolas, and 240 flat cars. The Russian government is said to have placed tentative orders for 30,000 cars, the Standard Steel Car Co. and the American Car & Foundry Co., each taking 10,000, the Pressed Steel Car Co. 6000, the Seattle Car & Foundry Co. 3000, and the Keith Car Co. 1000. The Western Pacific railroad is inquiring for 300 general service cars and the Grand Trunk railroad for 100 refrigerators.

Mixed Opinions

Are Entertained Whether Government Finally Will Fix Pipe Prices

Pittsburgh, Oct. 30.—Makers of pipe are waiting for the government to fix prices on that product. While some in the trade apparently do not think the government will establish levels, the majority of them are of the belief that such action will be taken. Mills are booked far ahead on contracts and, therefore, price fixing by the government would have no immediate effect on them, but it would ultimately bring out new business.

Shops Need Orders

Chicago, Oct. 30.—Practically nothing of any importance is being booked by cast iron pipe makers and some shops are finding themselves in need of orders for small sizes. Almost immediate delivery can be given on this class of pipe. Considerable business still is on the books for larger sizes. Demand for special castings continues active and most shops have considerable business of that sort to fill. Bids were to be opened Oct. 29 at Langdon, N. Dak., on 250 tons, and Oct. 30 at Kansas City, Kans., on 228 tons of 24-inch and 14 tons of 12-inch class C pipe.

Little New Business in South

Birmingham, Ala., Oct. 30.—While cast iron pipe plants continue to melt considerable iron the market has received no noticeable impetus from the recently reduced prices. There is a need for further business and some specifications are being bid on but the aggregate tonnage in sight is limited.

Tool Makers Accept War's Burden

Machine Builders at Annual Meeting Emphasize Part Industry is Playing in War—Period of After-War Readjustment is Discussed—Development of Foreign Fields May Afford Outlet for American Machine Tools

BECAUSE of the tremendous pressure to which the machine tool industry has been subjected by reason of the numerous emergency war requirements, the sixteenth annual convention of the National Machine Tool Builders association at the Hotel Astor, New York, proved to be of unusual interest. Sessions were begun Oct. 30 and extended over Oct. 31. The main theme of the meeting was the part the industry is playing in the war, while some attention was devoted to the outlook for the industry in the period of after-war readjustment. Some speakers indicated their belief that this after-the-war period will be a time of depression for the machine tool trade and for industry in general. Others pointed to the foreign fields now ripening for export endeavor which may afford an outlet for American products after the war. The convention is being given the benefit of expert advice in this direction by a number of men who are in close touch with the export situation in South America and various of the European nations. A feature of the convention was the address of George Merryweather of the machine tool division of the war industries board.

Tool Production Tripled

Following the transaction of routine matters at the opening session of the convention Tuesday morning, J. B. Doan of the American Tool Works Co., Cincinnati O., delivered a short address. He sketched briefly the development of the present situation in the machinery trade growing out of the war and reminded the convention of how much the country' safety is dependent upon the efforts of the industry. He said that the association had proved of great value to the government as a means of obtaining statistics and other essential information as a part of the war preparations. In conclusion, he suggested that it might be wise "in time of war to prepare for peace", that it might be well for machine tool builders to give some thought to conditions prevailing after the war demand has passed. In this connection, Mr. Doan made the interesting estimate that as many machine tools had been built in the past three years in this country as normally are built in 10 years, and that this might mean that the market would be surfeited with certain kinds of tools when the demand for specialized purposes has ceased.

Following Mr. Doan's address, a talk on England's experience industrially in preparing for the great war was given by Henry C. Japp, deputy director general in the United States for the British minister of munitions. As an indication of the strides taken by England, in developing its munition industry, he pointed out that its output of munitions now is 20 times that of two years ago. He cited one arsenal, which previously employed 11,000 people, which now employs 74,000. Mr. Japp laid particular stress on the part that women are playing industrially in the great war and how the employment of women and maimed soldiers in many lines of work has released many thousands of men for the front. He said that England has about 60,000 munition inspectors, of whom 60 per cent are women.

Business Faces Critical Period

An interesting talk on "What the war means to American business" was made by George E. MacIlwaine, of Babson's statistical organization, Wellesley Hills, Mass. Mr. MacIlwaine stated that it was the belief of his organization that American business would be confronted with a period of depression after the war as extensive as the prosperity of the past three years has been. He also said that it was the belief of his organization that the war would be settled on the field of diplomacy rather than by a crushing of Germany, that it would end in a sort of "Dutch treat", in which the principle of give-and-take would be preeminent. After expressing these opinions, Mr. MacIlwaine said that he and the Babson organization are predicting a period of extreme depression for several reasons. One of these, he said, is the immense burden of debt under which all the warring countries will be laboring as the result of a war, the bigness of which none as yet can comprehend. Another reason he gave was that the charts compiled by the Babson organization from a number of business indices over a period of years showed, he said, that the depression is inevitable. He, like Mr. Japp, also expressed belief that the war may not be considered an unmixed evil; in this connection he touched upon the new relations growing up between employers and employes, the plans being laid by many employers to give more importance to their workmen's place in the scheme of things after the war and he asserted that the general sociological and economic movement of the times is revolutionary.

In the afternoon session a series of addresses were delivered before the convention, to demonstrate the prospects for the exportation of machine tools to various countries, as follows: Russia, Professor R. Poliakoff, assistant professor of mechanical technology, Moscow; Belgium, E. G. Todd, a member of the firm of E. Isberque & Co., Antwerp, Belgium; France, Roger P. Redier; Italy, Sebastiano Raimondo, general director of Gio. Ansaldo & Co., New York and Spain; South America, G. E. Briggs, of the Buenos Aires branch of the National City bank of New York. The Wednesday morning session was given over to committee meetings, representing the various classes of machine tools.

Wants More Munitions from Canada

Toronto, Can., Oct. 31.—The announcement has been made that the British government now desires to have all the munitions that can be made in Canada. It has been understood by the imperial munitions board at Ottawa for some months that there would be a falling off in some lines of shell orders and many manufacturers, being unable to secure renewal orders, have closed down their plants or gone into other lines of manufacture. The reversal of this policy is stated to be due to the diversion of much British skilled labor to shipbuilding on a large scale, rendering it again necessary to look to Canada for an increased supply of munitions. The amount of contracts to be awarded, however, is largely dependent upon securing credit, as Canadian orders temporarily will be financed in Canada. The present program of the imperial munitions board contemplates an expenditure of $30,000,000 per month, which may be increased if the funds for financing orders are easily obtainable.

Predict Failure Abrogation Plan

Washington Considers Federal Trade Commission Proposal to be Foolish Experiment and Expects Bitter Legislative Fight if it is Attempted—Murdock and Bracken Express Their Views on the Question

WASHINGTON, Oct. 30.—Serious as is the federal trade commission's evident plan to urge legislation providing for abrogation of contracts, it is regarded here as a foolish experiment which will result in failure when the test of enactment finally comes. Introduction in congress of a measure of the type apparently desired by the commission is expected to precipitate one of the worst legislative fights ever seen in either house. While the questionaire sent out by the commission is addressed to individual steelmakers, business in general is vitally interested in the project and may be expected to line up with the steel manufacturers in a fight to retain one of the cornerstones of business principles. It will be pointed out that abrogation of contracts means the ruination of many individual businesses and the wrecking for all time of faith in the government.

Compare It With Liquor Act

Members of the commission point out that there is no parallel between Germany's treatment of her Belgian treaty and the proposed plan, but that there is a comparison of the project with the abolition of the liquor traffic in various states. If the commission does succeed in winning over congress to enact such unheard-of legislation, there are some who, while opposed to the plan, believe abrogation of contracts would not affect business seriously, except where long contracts have been entered into, because there will be but few trade agreements in existence. Those now on the books are believed to be within six to nine months of expiration. At best it would take congress several months to put through such a measure even after it convenes in December.

But what effect abrogation would have on future business is beyond comprehension. With a law on the books ready to wipe out any trade agreement the government might not approve, it is safe to say no contracts ever would be made. It would put each manufacturer in the position of spot buying and selling which, more or less, is the condition today, due to the unsettled expectation of various possible government actions. But it would preclude future development; it might even go so far as to cause men to refuse to further do business in America.

May Hamper After-War Trade

Abrogation of contracts offers the potential possibility of America taking the back seat in world trade after the war. This is a point possibly not considered in the machinations of the trade commission. To enable the United States to become a world power in commerce, industry must be allowed to bank on the future, and it can only as contracts will permit. With contracts classed as scraps of paper, the huge merchant fleet now building probably will find no cargoes to carry and eventually will fly under flags other than the stars and stripes. While regarded as a foolish experiment, even the suggestion of abrogating contracts may result disastrously for some in the iron and steel industry.

As has been pointed out in THE IRON TRADE REVIEW, the government needs no further legislation to regulate the steel industry. Its power to commandeer for army and navy requirements, the priority legislation, the agreement of the steel men to sell at "one price for all" and the country's upper hand in handling imports and exports is powerful enough to force any steelmaker to do its bidding. The enforcement of priority orders in effect abrogates contracts in that they are relegated to the bottom of the order books to make way for more urgent requirements. Yet this is not really abrogation; it is in effect a moratorium.

Extras List Issued

Government Gives Out List of Extras and Differentials

Washington, Oct. 30.—The complete list of extras and differentials to be allowed on the steel products, with the exception of pig iron, on which prices have already been fixed by agreement between the government and representatives of the steel industry, has been announced at the Washington office of the American Iron and Steel institute. These extras and differentials are effective as of the dates on which the President announced the prices.

The extras included in the announcement cover semifinished steel, steel bars and bands, small shapes, standard shapes, plates, hoops, concrete reinforcing bars, rivet rods, spring steel and tire steel. In the case of concrete reinforcing bars, it is specified that twisted squares shall take 0.125c extra per pound and deformed sections, 0.075c extra per pound. In so doing, the new list takes the highest extra of the old reinforcing bar list and bases extra solely upon that item. The carbon and inspection extras remain as in the old card.

The extras on semifinished materials which are to be added to the base price per gross ton of rerolling billets, slabs and sheet bars are as follows:

FOR CARBON

Up to and including 0.25 carbon.....	Base
0.26 to 0.60 carbon.....	$1.00
Over 0.60 carbon.....	2.00

Where range of carbons is specified, extra is to be based upon the mean of such carbons.

FOR SIZE AND CUTTING

For cutting small billets.....	$0.50
Slabs 16 square inches in area and larger	Base

On sheet bars, and billets under 3½ inches for random lengths down to 15 feet, no extra is to be charged, but regular charge of 50 cents per ton is to be made for such bars and billets cut to exact lengths.

Prices and extras apply only to material of standard specifications; customary extras for special phosphorus, manganese, silicon, sulphur, etc., to apply.

All the other lists of extras are the same as those which have been in standard use by the trade for a year or more.

Issue Aircraft Standards

Specifications for various materials entering into the construction of airplanes for the government have been formulated and issued by the international aircraft standardization board, of which F. G. Diffin of the advisory commission of the council of national defense, Washington, is chairman. The specifications so far issued cover aluminum, copper, spelter, alloy steel bars and billets, medium carbon steel bars and billets, tolerances on steel bars, steel wire cable, manganese bronze, phosphor bronze, naval brass, babbitt metal, sheet brass and sheet copper, etc.

The British government has prohibited the use of ferrochrome in the manufacture of stainless steel for cutlery purposes.

Reduced Profits

Shown by Steel Corporation in Third Quarter—Heavy Allowances Made

A drop of about $12,000,000 in the total earnings of the United States Steel Corp. is shown in the report just issued for the third quarter. The aggregate was approximately $132,000,000, as against $144,498,076 in the preceding quarter. The amount allowed for war income and war excess profits taxes, $63,733,013, or $10,000,000 more than for the second quarter, aided materially in reducing the total. Further allowances for expense incident to operations, taxes, and interest on bonds of the subsidiary companies, raised the amount set aside to $68,243,784. This compares with $90,570,204 in the second period.

	Earnings sub. bonds	Less: Int. subsid. bonds	Balance
July, 1917..	$23,500,463	$739,795	$22,760,668
Aug., 1917..	24,287,844	739,119	23,548,725
Sep., 1917..	22,673,788	739,397	21,934,391
	$70,462,095	$2,218,311	
Total earn. after oper. exp. includ. ord. repairs and main. and int. on subsid. bonds			$68,243,784
To sinking funds subsid. bonds and deprec. and extra. replacement		$11,159,843	
Sink'g fund U. S. Steel bonds		1,838,564	
			12,998,407
Net income			$55,245,377
Quarterly int. on U. S. Steel bonds		$5,288,436	
Prem. payable on bonds redeemable		224,612	
			5,513,048
Balance			$49,732,329
Regular dividends:			
Prfd., 1¾ per cent...		$6,304,919	
Com., 1¼ per cent...		6,353,781	
		$12,658,700	
Extra dividend:			
Com., 3 per cent.		$15,249,075	
			27,909,775
Surp. for quarter			$21,824,554
Surp. for first half			$59,137,993
Surp. for nine months			$80,962,547

Contract Obligations

Considered by Institute General Committee—May Announce Prices

New York, Oct. 31. (By wire.)—A meeting of the general committee of the American Iron and Steel institute is being held today, and it is understood discussion will focus upon the government's request for suggestions on proposal to abrogate contracts and on iron and steel prices not yet announced. It is believed that prices not yet established by the government may be fixed with latter's consent by announcement by committee.mittee.

The British government is reported to have orders for 2,000,000 6-inch shells between the Westinghouse Electric & Mfg. Co., Baldwin Locomotive Works and the Crucible Steel Co. of America.

The American Steel & Wire Co. is accepting orders from regular customers at $3.45, Pittsburgh, for plain fence wire and $3.50 for wire nails. The Western Pacific railroad has inquired for 1000 cars.

Close Scrutiny

Of Steel Industry Necessary With Fixed Prices, Says Murdock

Washington, Oct. 31.—Victor Murdock, the newest member of the federal trade commission, believes that price fixing demands scrutiny of the most penetrating kind. This opinion is expressed in connection with the proposal of the trade commission as to the abrogation of contracts.

Mr. Murdock, in a statement to THE IRON TRADE REVIEW, said he believed the question should be gone into thoroughly; that he is unable to see how price fixing can be made equitable without application of the fixed prices to transactions under contracts, and that, to be fair, price fixing and contract legislation should apply to everything.

Mr. Bracken, in referring to Germany's outrage of Belgium, declared that treaties of nations are matters between governments, but that contracts, in a country at war, are matters between that government and individuals which, for national safety, may be abrogated. The good of the common cause may require breaking of contracts the same as a state may vote for prohibition.

"It's a matter of personal right," Mr. Bracken said, "which may be revoked if the common welfare is endangered."

Neither Mr. Murdock nor Mr. Bracken would say how far the commission really will go in carrying out the abrogation policy.

Independent Mills

Make No Change in Wire Following Leading Maker's Advance

Pittsburgh, Oct. 30.—Independent makers of wire and wire products continue to maintain their price schedules, the advances made by the American Steel & Wire Co. having had no effect on them one way or the other. The inquiries made by the leading interest are understood to have been determined upon in order that they may more nearly meet the probable levels that may be established by the government. This interest is operating heavily on contracts and is not in a position at this time to accept prompt business.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, Oct. 30.—The copper producers' committee continued work quietly the past week in its offices at 60 Broadway, with no publicity given officially as to its plans and progress. However, it is known that the committee is still working out October deliveries on the old high priced contracts and these deliveries probably will run well into November. Likewise, November deliveries will run well into December. However, some producers are making contracts with their regular customers for December and positions further ahead, at the fixed price of 23.50c, subject to the provision that they have a surplus of copper after the government's requirements are filled and the deliveries on the old contracts are completed. Occasional sales of small lots of spot electrolytic copper continue to be made at prices above 23.50c, but the deliveries on the old contracts have decreased the recent urgent demand for such lots. Casting copper producers have reduced their quotation to 23.50c. It is expected that the war industries board will announce one price of 23.50c for prime lake, electrolytic and casting copper, while scrap copper prices will be established at fixed differentials below this 23.50c price.

The recent reduction in the lead price of the American Smelting & Refining Co. to 5.50c, St. Louis, has brought out a heavy demand from consumers. Leading independent producers, however, have withdrawn from the general market, aside from their regular customers, asserting they would rather stock lead than sell at the quoted price. Brokers and dealers have been doing a rushing business and prices in the outside market have advanced to nearly ½c premium over the leading interest's price. The market may be quoted as follows: Prompt, November and December shipment, 5.75c to 6c, St. Louis.

The spelter market continues dull and weak, with prices a fraction lower than seven days ago. Prime western may be quoted about as follows: Prompt, 7.62½c to 7.75c; November, 7.87½c; December, 8c. High grade spelter still is quoted nominally 13.50c, but has sold as low as 12c, it is reported.

All grades of tin are scarce, with demand active. Prices have been up sharply the past week, both in this market and in London. Today 65c was bid for spot Straits; 64c for spot Banca; and about 60c for spot Chinese No. 1 tin.

Antimony prices have sagged still further. Chinese and Japanese brands were offered this week for spot and November delivery at 14c, duty paid.

Aluminum prices also have declined still further. No. 1 virgin ingot now is quoted 37c to 39c in the outside market; No. 1 remelted is quoted 36c to 37c; and No. 12 alloy, 27c to 28c.

Testing Thread Gages for Accuracy

A Description of a Recently Developed Device for Testing the Angle and Lead of Thread Gages—Simplicity and Accuracy are Essential in Testing Gages for Munitions Work

AS THE tendency for standardization in modern manufacturing practice increases, the importance of gages of various types is more strongly emphasized in all branches of industry. The use of gages has been particularly accentuated as a necessity by the many contracts placed in this country by the United States and by the allied governments for all kinds of war supplies. Gages become absolutely essential where large quantities of precision work are to be turned out. Of the many different types, the thread gage is one of the most difficult to construct accurately and to measure precisely. Many attempts have been made to produce satisfactory thread gages with varying degrees of success. One of the chief difficulties has been the lack of proper machines designed to turn out accurate work. Another reason is that facilities for measuring thread gages are not in common use and are to be found in but very few shops. Still another factor is that the production of accurate thread gages requires considerable skill and dexterity and few toolmakers have had this experience.

For these reasons, the manufacture of thread gages has been confined to a very few factories which have made a special study of the problem. Because the industry in general has been rather unfamiliar with the qualifications desirable in accurate thread gages, there has been but little complaint in regard to the comparative lack of perfection found in so many types in use today.

Increasing Demand for Perfection

During the last two years, however, there has been considerable education of users of thread gages. The engineering societies, the large munition concerns and other large manufacturers realize that the question of screws, taps and tapped holes is one of their most difficult problems. In the manufacture of taps, hobs for hobbing dies, male thread gages and hobs for female thread gages, the question of correct lead and correct angle of the thread has been found to be even more important than the correct diameter measurement. While a number of gages of various types have been designed to check the angle of lead, but only a few of these gages are sufficiently accurate and reliable to check both the angle and the lead. The problem, therefore, is to design a thread-gage testing device or measuring machine for the angle and the lead, which is rigid, substantial and thoroughly accurate and upon which a very small degree of error may be easily ascertained.

Principle of Gage

In testing a flat surface, a knife-edge straitedge is used as the smallest amount of error, even less than 0.0001 of an inch will readily show light between the surface and the knife edge. This principle seems to be the most simple and reliable one to be used in testing lead and angularity. Two curving surfaces coming together on a line of contact, will show light through any line-quality as readily as a knife-edge gage on a flat surface. The thread lead and angle measuring machine described in this article, is based on the principle of seeing light between two curved surfaces. If the surfaces do not coincide, 0.0001 of an inch can be detected by a person with ordinary eyesight, and with the aid of a magnifying glass, 0.00005 of an inch can easily be seen where such error exists.

Fig. 1 shows a general view of the thread, lead and angle gage and illustrates the solid and substantial construction. The machine consists primarily of *A*, which is a heavy cast bed; stationary head, *B*, which carries a fixed center, *O*, and is permanently fixed to casting, *A*. A sliding tail-block, *C*, which can be clamped positively to the bed, *A*, by means of the two clamping screws, *QQ*, carries a spring center, *P*, that can be withdrawn by the knob, *E*, or clamped in position by the screw, *F*.

The slide, *D*, which is shown in Fig. 3, carries a cross-slide which is accurately adjusted in alignment with the axial line through the centers, *O* and *P*. All planes and surfaces are either perpendicular or parallel to this axis. The lower member of the compound

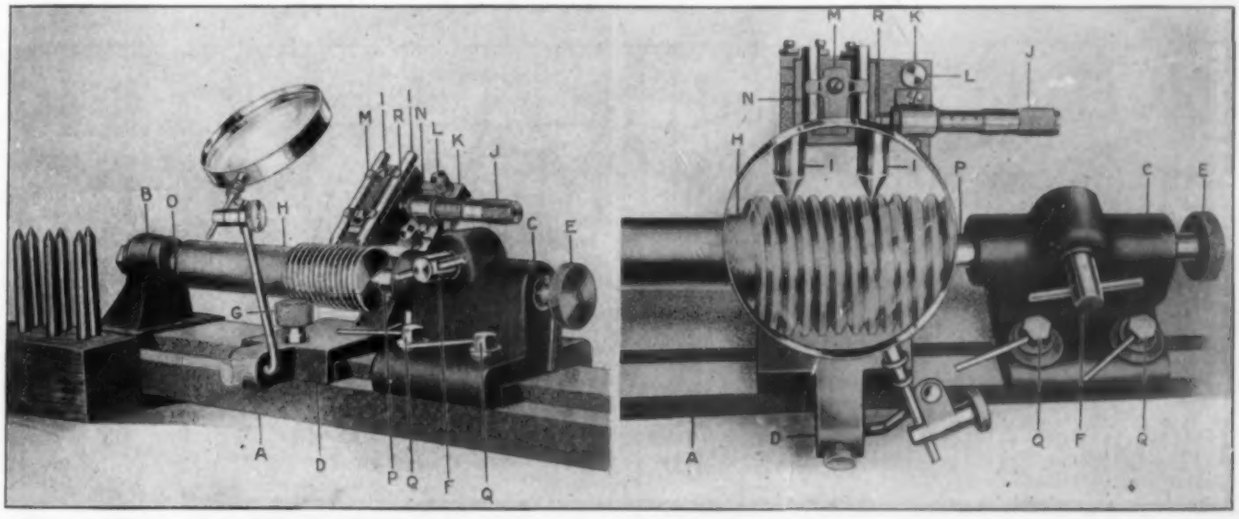


FIG. 1—GENERAL VIEW OF ANGLE AND LEAD TESTING DEVICE FOR THREAD GAGES

FIG. 2—VIEW OF TESTING DEVICE SHOWING THE USE OF THE MAGNIFYING GLASS

slide, *K*, is adjustable on an axis perpendicular to the line of centers and may be clamped in position suitable to the diameter of the thread gage to be measured. A micrometer head, *J*, operates against a hardened stud, *R*, in the upper member of *N* of the compound slide. The movement of *N* can be measured by the micrometer head or by the use of distance gages or Swedish blocks.

Determining the Measurement

The upper member carries two angle test pieces, *II*, held by a spring clip, *M*, which permits of adjustment by finger pressure. The center distances between the *V's* and the angle test pieces, *II*, are exactly 1 inch, giving a basis for checking error of lead in gages which are measured by the English standard and which are over one inch long. On metric threads less than one inch long, the micrometer or Swedish gage blocks are used between the point of the micrometer and the stud, *R*, on the slide. Fig. 2 shows the points of these angle test pieces fitting into the angle of the threads on the gage, *H*, which is in position.

Method of Checking Lead

Fig. 4 indicates a thread gage placed in the machine with the two points in position to check the lead. The first operation is to turn the thread gage on centers in the machine until one of the test points may be moved in a position, as shown in Fig. 5, shutting out light on both sides of the cone point.

After the first point has been pressed down lightly in the direction of the arrow, as shown in Fig. 5, the other point is then brought down until it touches the thread, as shown in Figs. 6 and 7. If the lead on the thread gage is short, the effect will be as indicated in Fig. 6, which has been exaggerated to illustrate the point clearly. If the lead on the thread gage is long, the effect will be as shown in Fig. 7. The amount of error in lead of the thread gage is determined with the micrometer, the first point being withdrawn from the thread, as shown in Fig. 8. Point No. 2 may then be moved in either direction.

The line drawings, Figs. 10 to 19, inclusive, show the methods used in

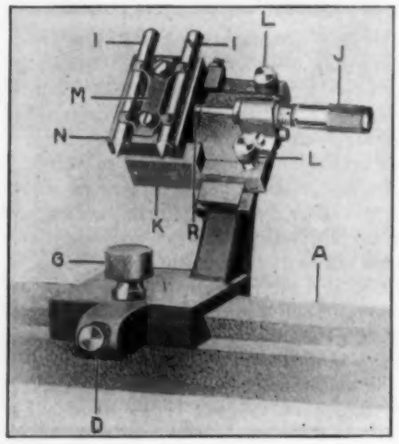


FIG. 3—DETAIL OF CROSS ARM WITH TEST POINTS

checking the angle of the thread with the angle test gage. The views simply show the end test gage, and the contour of the thread. Fig. 10 shows a standard test angle gage fitted into a thread which is off angle, having an angle too large. After testing it with the standard plug, a plug with a greater angle is fitted, as shown by the dotted line. In this way the amount of angular error can be ascertained.

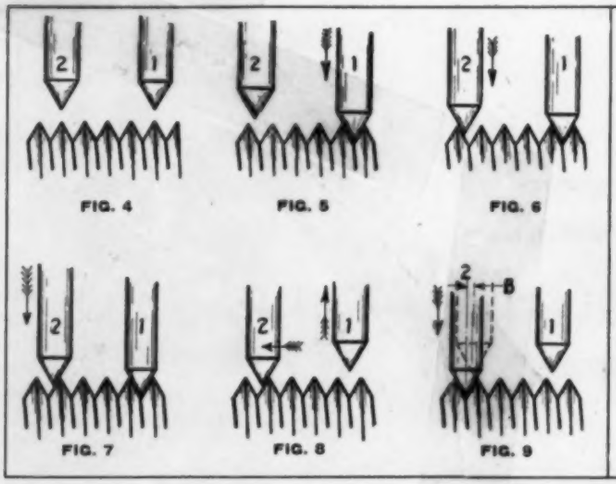
Fig. 11 shows a gage in a thread having too small an angle. Fig. 12 shows a thread angle off center. Fig. 13 shows a thread having hollow spots in its wall. These errors are shown up very prominently by the light which passes through between the angle test gage and the thread. These gages have been developed and are manufactured by the H. E. Harris Engineering Co., Bridgeport, Conn.

Air-Driven Turbine Grinder

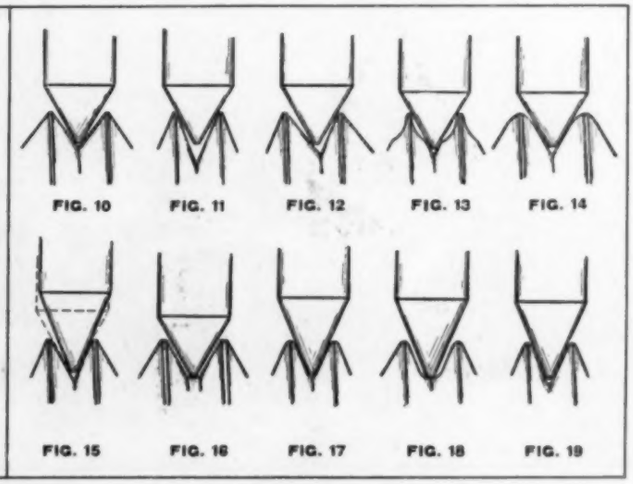
Illustrated herewith is a hand grinder driven by a direct-connected air turbine, used in the plant of the Henry Perkins Co., Bridgewater, Mass. Its development is attributed to Charles Perkins, who recognized the need for a small hand grinder for grinding intricate castings. Simplicity characterizes the operation of the turbine. Air is supplied to a single row of blades through six nozzles and after expansion flows through the open ports seen on the side of the turbine housing. Because considerable axial thrust is developed owing to the use of but a single row of blades a thrust bearing is provided to obviate any movement of either the rotor or the shaft in an axial direction.

Rotor Attains High Speed

The rotor, which is 6 inches in diameter, runs at a maximum speed of 12,000 revolutions per minute when operating with air at a pressure of 60 pounds per square inch. Normally, the working speed of the grinder is from 10,000 to 11,000 revolutions per minute. The overall length of the turbine, with grinder attached is 11 inches. Under ordinary operating conditions a 2-inch or a 2½-inch grinding wheel is used; however, a somewhat larger wheel can be used successfully. No operating difficulties

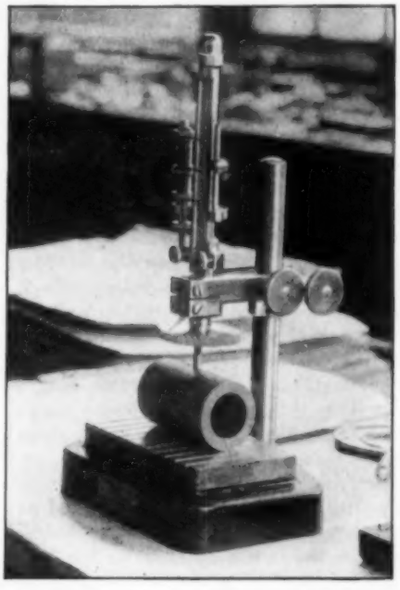


FIGS. 4 TO 9—HOW THE GAGE IS USED TO TEST THE LEAD OF THREADS



FIGS. 10 TO 19—HOW THE GAGE IS USED TO TEST THE ANGLE OF THREADS

COMPACT AIR-DRIVEN TURBINE GRINDER



SPECIAL TESTING BASE IN USE ON FLUID GAGE

are experienced, it is said, because of the small number of working parts. The turbine's small frictional resistance and its few working parts obviate any necessity for close attention.

Heavy Duty Vertical Lifting Truck

The Lewis-Shepard Co., Boston, recently developed an elevating truck of lighter design than the heavy-duty model formerly manufactured by that company. The truck is of 2500 pounds capacity and is equipped with a high vertical lift controlled by a lifting handle which permits the load to be elevated when the handle is turned to the side. This facilitates operation in narrow aisles or other congested quarters.

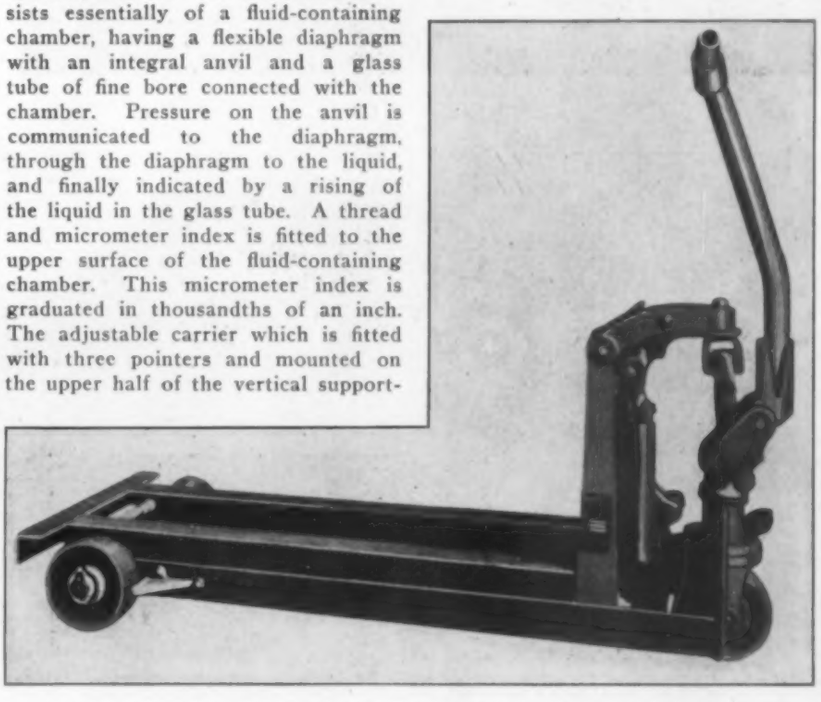
The entire truck, with the exception of the wheel is made of malleable iron or crucible steel. The wheels are of cast iron. The truck is made in six models, three of which employ 6-inch wheels; the other three, 10-inch wheels. The ratio of lifting power is said to be 40 to one, which means that an actual weight of 2400 pounds requires a lifting exertion on the part of the operator of only 60 pounds.

Extends Use of Fluid Gages

Fluid gages are being used extensively in many different kinds of engineering work; their adaptability to various gaging operations by the use of special bases or fittings being an important factor in their widening application. Illustrated herewith is an application of a representative instrument of this type, fitted with a special base for the rapid gaging of bushings for automobile motors. The illustration depicts a fluid gage manufactured by the Coats Machine Tool Co., 30 Church street, New York, in use at the plant of the Packard Motor Car Co., Detroit. The instrument consists essentially of a fluid-containing chamber, having a flexible diaphragm with an integral anvil and a glass tube of fine bore connected with the chamber. Pressure on the anvil is communicated to the diaphragm, through the diaphragm to the liquid, and finally indicated by a rising of the liquid in the glass tube. A thread and micrometer index is fitted to the upper surface of the fluid-containing chamber. This micrometer index is graduated in thousandths of an inch. The adjustable carrier which is fitted with three pointers and mounted on the upper half of the vertical supporting rod, makes possible the measurement of one ten-thousandth of an inch. These fine measurements are made by means of the adjustable scale. The lower pointer is used to set the carrier to zero, and the two pointers above it are used to indicate the tolerance limits. Adjustment of the carrier and its pointer is effected by the thumb screw located directly below the pointers. The instrument is set roughly by the rack and pinion, which is operated by one of the thumb screws at the right; the second thumb screw being used to clamp the supporting arm in position. Final adjustment is made by the micrometer device located directly over the anvil. The displacement of the diaphragm effects a displacement of the liquid in the tube, of an amount proportional to the areas of the tube and the diaphragm. It is said that these areas are proportioned such that variations of one ten-thousandth of an inch can be read directly, while smaller variations easily can be approximated.

Two patents to Charles L. Parsons, chief chemist, bureau of mines, dedicated for the free use of the people, have been granted for a process for the purifying of uranium compounds and for a process for preparing oxides of uranium.

The process for the preparing of uranium oxide is of especial importance at this time owing to the fact that it is now definitely known the Germans are using uranium steel in some of their large cannon. This



LIGHT-WEIGHT, VERTICAL LIFTING TRUCK FOR HEAVY WORK

process will enable pure black oxide of uranium to be obtained for the production of ferro-uranium. Experiments in the production of uranium steel itself are also under way.

Gravity Conveyor Conserves Labor

Gravity conveyors, through their several advantageous characteristics, have created a distinct field of application where it is desired to move materials economically and rapidly. The introduction of this labor and time-saving means of handling materials has eliminated much lost motion and has served to effect considerable savings. In foundries, pig iron may be moved with a minimum of effort from railroad cars to the storage pile, from the storage pile to the cupola; molds may be carried to the cupola spout and the finished castings conveyed from place to place by means of portable sections of gravity conveyors. The accompanying illustration shows a conveyor made by the Minnesota Manufacturers association, North St. Paul, Minn. The steel rollers are provided with ball bearings which operate in hardened steel races. A special lock nut and washer holds the ball-bearing stud securely in the angle-iron side frame, and permits of easy removal of single rollers. The conveyor is carried on special adjustable supports.

UNLOADING PIG IRON WITH GRAVITY CONVEYOR

The Canada Carbide Sales Co., 30 Church street, New York, has been appointed exclusive sales agent for the Southern Ferro Alloys Co., Chattanooga, Tenn. The principal output in the immediate future is to be 50 per cent ferrosilicon.

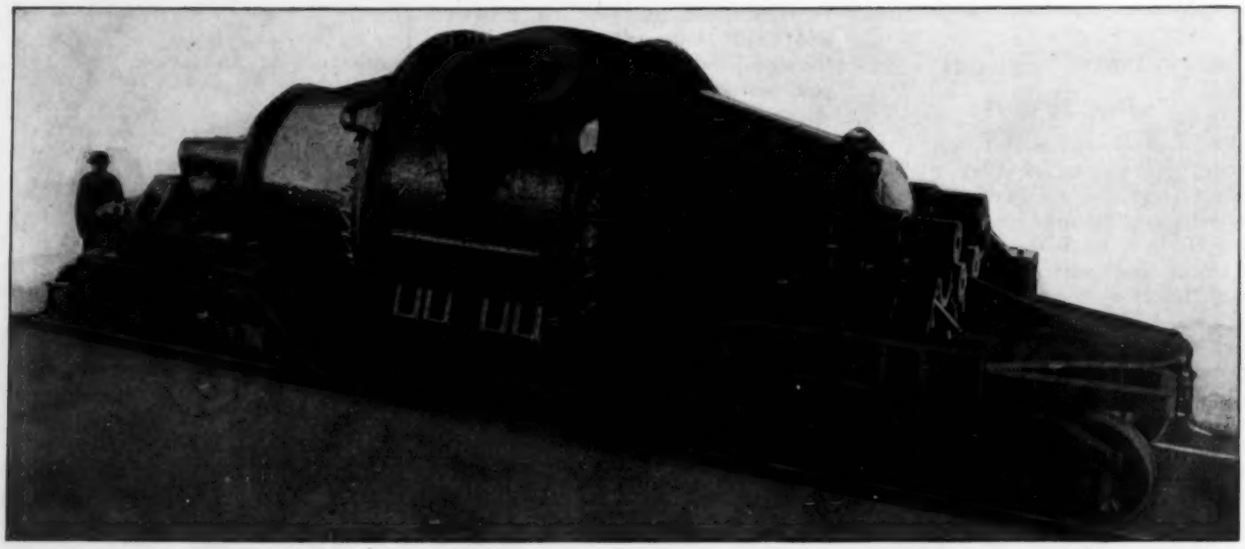
Builds Huge Metal Car

A HOT metal car of unusually large capacity was recently constructed by the Treadwell Engineering Co., Easton, Pa. The car, which is designed to carry 94 tons of metal, is now being used at the plant of the Jones & Laughlin Steel Co., Pittsburgh, to transport molten metal from the blast furnaces to the steel plant. The ladle has been especially designed with small openings at the top in order that the metal may sustain no detrimental effects through long delays in transit.

The body of the ladle is made of steel castings in flanged sections held together by bolts. If for any reason the ladle must be opened the sections can be separated and the entire lining removed by a pusher in the manner usually practiced. The ladle body is supported and tilted on trunnions. To give a more solid support both trucks are equipped with six instead of four wheels. The arch bars are hinged together to enable the three wheels on each side of the trucks to bear equal loads under all conditions.

Sculling is said to be eliminated. If the ladle is not entirely emptied at one time it is said that succeeding casts will cut all material so left, and the ladle has proved to be self-cleaning.

A new form of safety glass has recently been developed by a New York firm. The lens, in the case of a goggle, consists of two layers of optical glass,



A HOT METAL CAR OF UNUSUALLY LARGE CAPACITY AND UNIQUE DESIGN

which may be plain or curved, with a layer of celluloid between. The whole, it is stated, is welded into a solid mass. The glass is manufactured by Strauss & Buegeleisen, Warren street, New York.

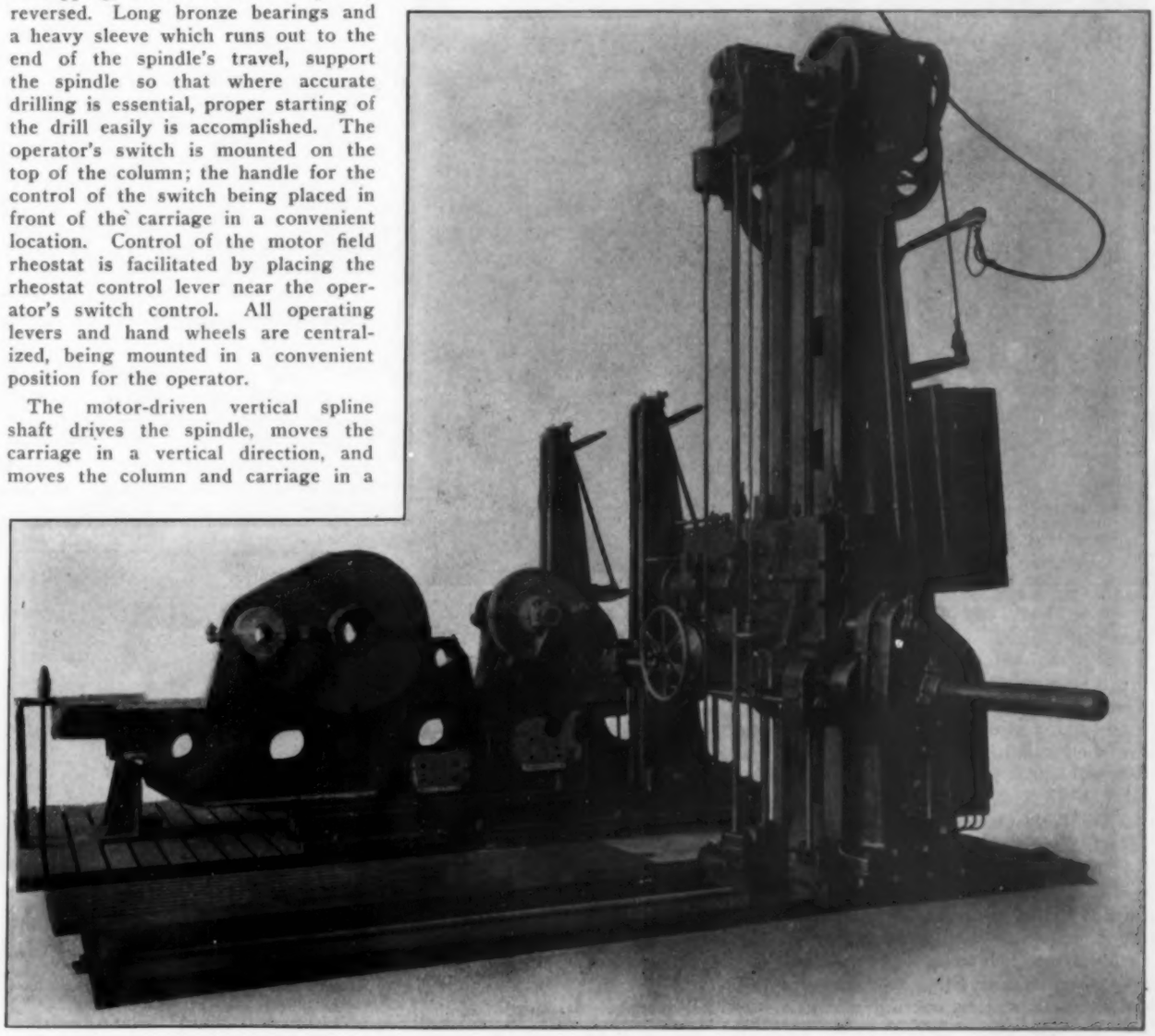
According to *The Engineer*, London, the newly manufactured compressed cellulose piping has proved satisfactory in chemical factories and also in mining works. The new material, it is said, is non-porous, is considerably lighter than iron, can be worked like wood, and is consequently easily moved and repaired. As cellulose is a bad conductor of heat, it requires no particular protection against heat; and it is also claimed to resist chemical influences better than iron. Cellulose tubes are said to be suitable for conducting hot and cold air, and for corrosive gases which eat into iron conductors.

Designs Large Boring Mill

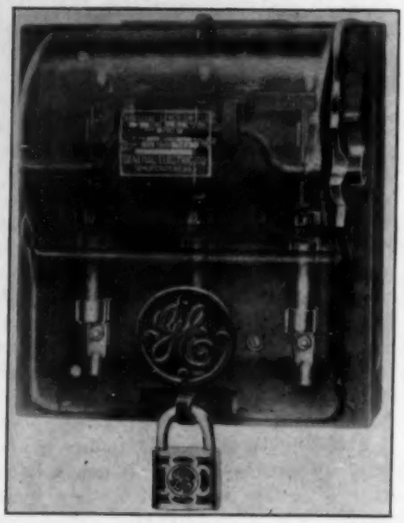
THE Pawling & Harnischfeger Co., Milwaukee, is building a horizontal drilling and boring machine which incorporates a number of unusual features. The machine uses dynamic braking in controlling the forward and reverse motions of the spindle which is especially useful in tapping, as the motor is quickly reversed. Long bronze bearings and a heavy sleeve which runs out to the end of the spindle's travel, support the spindle so that where accurate drilling is essential, proper starting of the drill easily is accomplished. The operator's switch is mounted on the top of the column; the handle for the control of the switch being placed in front of the carriage in a convenient location. Control of the motor field rheostat is facilitated by placing the rheostat control lever near the operator's switch control. All operating levers and hand wheels are centralized, being mounted in a convenient position for the operator.

The motor-driven vertical spline shaft drives the spindle, moves the carriage in a vertical direction, and moves the column and carriage in a horizontal direction. The motor is bolted to the top drive bracket; the drive bracket being secured to the column top. The carriage travel and column travel mechanisms are connected with the vertical spline shaft by two reversing friction clutches. The carriage travel mechanism consists of a stationary screw shaft secured to the top drive bracket and the column base plate. A bronze nut and worm wheel are mounted in an oil-tight gear case and bolted to the carriage. A steel worm is driven from the clutch shaft with spur gears. For accurate adjustment of the carriage, the reversing shaft is provided with a hand wheel, while for similar adjustment for the column a ratchet lever is provided. The spindle is bored for a No. 6 Morse taper shank and the end is provided with a cap nut for holding other tools. Thrust due to feeding is taken up by ball bearings.

Dimensions of the column base plate are 3 feet by 3 feet 10 inches. The sliding base is 16 feet 4 inches by 4 feet 4 inches and 12¼ inches high, suitably notched to take bolts for holding the sliding base to the floor plate. A variable speed motor is used, giving spindle speeds varying



HORIZONTAL DRILLING AND BORING MACHINE DEVELOPED BY THE PAWLING & HARNISCHFEGER CO.

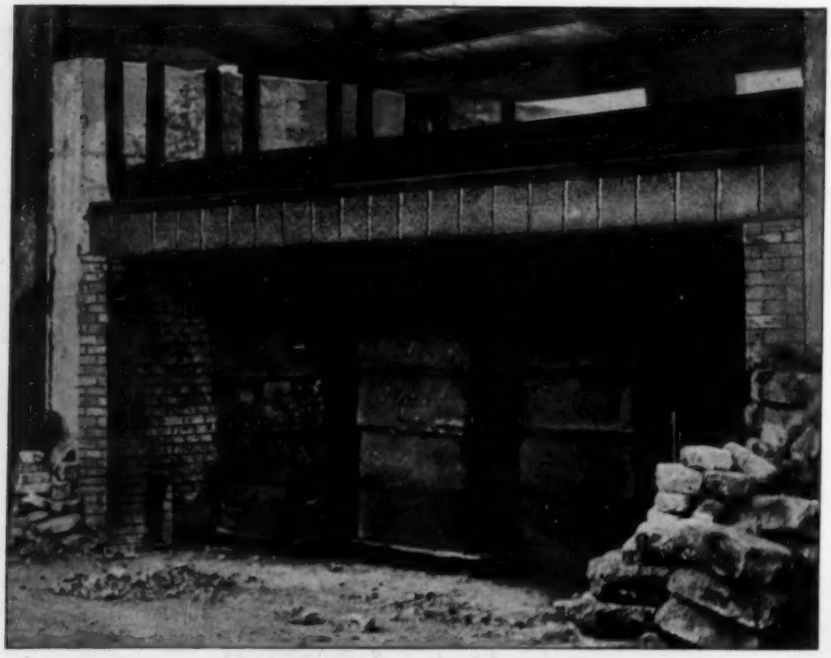


ENCLOSED SWITCH AND FUSES FOR PROTECTION OF OPERATOR

Electric Switch Designed for Safety

A new type of lever switch enclosed in an iron casing, recently has been developed by the General Electric Co., Schenectady, N. Y. The accompanying illustration not only shows the exterior protective casing, which is of sheet metal, but also reproduces in phantom the working parts and the slate base. The padlock prevents "outsiders" from tampering with the fuses in the lower part of the switchbox. Moreover, the switching lever at the upper right-hand side cannot be closed while the covering over the fuses is open, and vice versa.

When two or three operators are involved it has been observed that although one of them may throw on the switch with perfect safety, he may endanger another operator working on a machine whose motor gets its current through the switch. To meet this condition three locks, each controlled by a different individual, may be used, thus enabling all operators to keep in touch with what is going on. The switches can also be provided with spring catches which must be pressed down while the switching lever is moved. Both hands are thus required to switch the electricity on or off and further safety is achieved.



FLAT SUSPENDED TYPE ROOF ARCH FOR ANNEALING OVENS

from 10 to 450 revolutions per minute. One revolution of the ratchet wheel will move the carriage 0.4 inch. Four changes of feed are available, for each spindle speed varying from 0.008 to 0.016 inch and 0.03 to 0.07 inch.

The horizontal spindle travel is 3 feet, the vertical carriage travel is 6 feet 5 inches and the column travel is 11 feet 6 inches. The machine is driven by a 7½-horsepower variable-speed motor and the motor speed varies from 500 to 1500 revolutions per minute. The equipment includes an automatic starter, operator's switch and a motor field rheostat with the necessary relays.

Roof Arch for Annealing Ovens

A flat, suspended-type roof arch for annealing ovens in malleable foundries has been developed by the M. H. Detrick Co., Chicago. This arch, which is the result of considerable experimental work, is said to have indicated through trial installations that a uniform distribution of heat may be maintained which eliminates the possibility of hard malleables due to unequal annealing in various parts of the oven.

The accompanying illustration shows a flat, suspended arch in use at the plant of the Rockford Malleable Co., Rockford, Ill. In this type of roof arch, the fire bricks are suspended like pendulums from I-beams which rest upon the side walls. This construction eliminates the side thrust inherent to sprung arches and does away with buck stays.

The fire bricks used in the arch of the Rockford furnace are 6 x 10½ x 10½ inches and are grooved on the top surface to receive the flange of a casting having an I-beam cross-section. Each casting supports 10 bricks, making each roof section 6 inches wide and 5 feet long. Successive rows suspended from I-beams resting on the side walls and spaced at 5-foot intervals comprise the roof of the oven. Eyelets in the castings permit the lifting of any one row from the roof as desired. The opening in the roof thus made, provides space to remove any brick in the row that may require replacing. Expansion and contraction are matters of automatic adjustment as each brick or tile is supported individually and no strains or stress are set up in the arch as a whole.

Develops Improved Brakes

An alterating-current, motor-operated brake and a direct-current magnet-operated brake were recently placed on the market by the Cutler-Hammer Mfg. Co., Milwaukee. In the first mentioned brake, a high torque squirrel cage motor is employed, geared to a toothed sector,

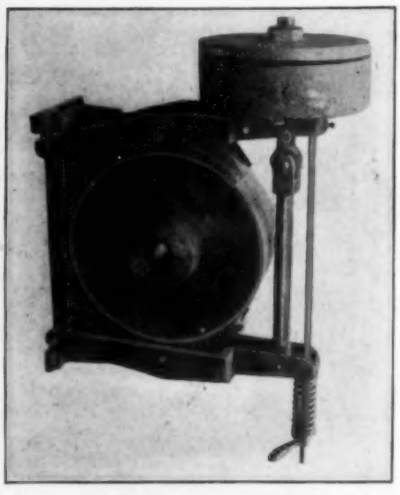


FIG. 1—ALTERNATING CURRENT MOTOR-OPERATED BRAKE

which is linked to the arms carrying the brake shoes. When power is applied the motor revolves until the brake is released The release of the brake automatically stalls the motor and maintains the latter in the released position until power is cut off. It is said that adjustments for wear in the brake may be made by turning a nut on the end of the thrust rod, shown in Fig. 1. The adjustment is required two or three times during the life of the brake lining. The brakes are made in sizes ranging from 8 to 30 inches with horsepower ratings up to 250. The solenoid brake shown in Fig. 2 is made in six standard sizes ranging from 8 to 27 inches with horsepower ratings similar to those of the motor operated brake.

Issuing Specifications

Preliminary specifications for international standards of airplane materials are being issued by the international aircraft standards board, which comes within the scope of the advisory commission of the council of national defense. This standardization work has been in charge of F. G. Diffin, chairman of the board and copies of the standard may be obtained from him at Room 224 Bond building, Washington, D. C. All international standards on airplane materials and fabricated parts will be issued from this office.

Coal Loader for Ground Storage Piles

The problem of finding a convenient method of loading coal from ground storage, gave impetus to the invention of a wagon loader, which is now finding general application. The accompanying illustration shows a wagon loader manufactured by the Link-Belt Co., Chicago, loading coal into a motor truck at the plant of the American Optical Co., Southbridge, Mass.

The bituminous coal arrives in railroad cars and is dumped from the trestle to the ground storage pile. The power house is situated some distance from the storage pile which necessitates the use of a motor truck for rapid transportation. It is said that the wagon loader loads the truck in approximately five minutes. One man is required to operate the wagon loader which is driven by an electric motor.

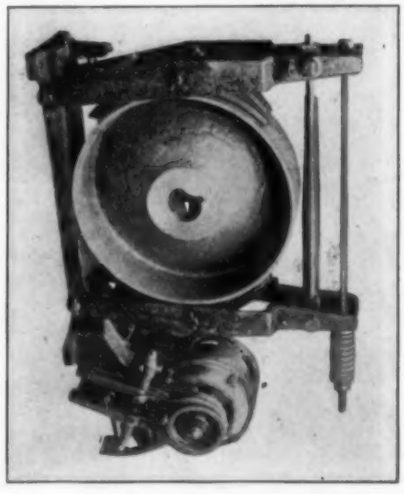


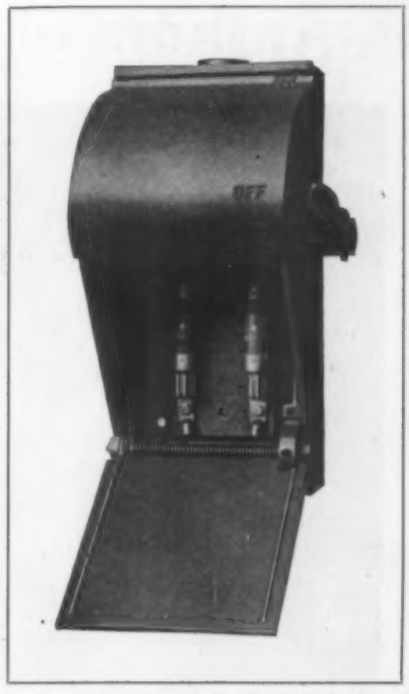
FIG. 2—DIRECT CURRENT MAGNET-OPERATED BRAKE

Switch and Fuses Are Protected

In steel mills, factories, mines, and similar places, where men with practically no knowledge of electricity and its attendant risks are employed, the need for an absolutely safe switch has become a necessity. To be entirely safe a switch must be so constructed that all live parts are totally enclosed and are likewise inaccessible.

The device shown in the accompanying illustration consists of a single-throw knife switch and enclosed fuse holders mounted in an exceptionally strong cast iron box, with an operating handle outside the housing. The box is designed for conduit connection and has a partition separating the switch blades from the fuse holders. The upper or switch compartment can be opened only by removing two machine screws. This compartment should never be opened except when making connections, or in case of inspection or repairs, as the switch is opened and closed by the operating handle from the outside through a shaft and lever inside the box.

The lower or fuse compartment, containing the fuses and fuse holders, is the only part of the switch that need be opened, and then only to replace blown fuses. The door of this compartment is interlocked with the switch by a vertically acting push rod which engages a boss on the fuse-compartment door, so that it can be opened only when the operating handle is in the off-position and the circuit broken. Furthermore, with the door of this compartment open it is impossible to close the switch, thus eliminating the danger of a live line.



ENCLOSED SAFETY SWITCH

AUTOMATIC MACHINE LOADING TRUCK FROM GROUND STORAGE PILE

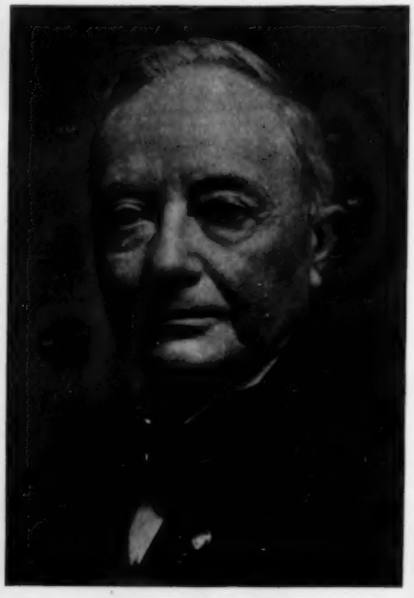
Authors of Papers Read at Cincinnati

DANIEL B. MEACHAM
Partner, Rogers, Brown & Co., Cincinnati

DANIEL B. MEACHAM became a member of the firm of Rogers, Brown & Co. in 1891. At that time he removed from St. Louis to Cincinnati. His long business experience in that city, extending over the past 26 years, appropriately has fitted him to speak for "Cincinnati and Its Industries", and to outline the notable manufacturing development of the Queen City.

No one is better qualified to speak on "Fifty Years of Iron and Steel" than Joseph G. Butler Jr., vice president of the Brier Hill Steel Co., Youngstown, O. Just 51 years ago he became managing partner of Girard Iron Co., Girard, O. From 1878 to 1911 he was general manager of the Brier Hill Iron & Coal Co. Mr. Butler has occupied many positions of prominence and trust in the iron and steel industry and always has been foremost in the promotion of its best interests. He was a member of the industrial commission which visited France in 1916 with the object of studying conditions there.

Eugene P. Thomas, president of the United States Steel Products Co., is peculiarly equipped to discuss commercial problems of today, since so much of present business relations deal with export and overseas matters. Practically all Mr. Thomas' business experience has been concerned with foreign trade and part of this was gained abroad as representative of American steel interests.



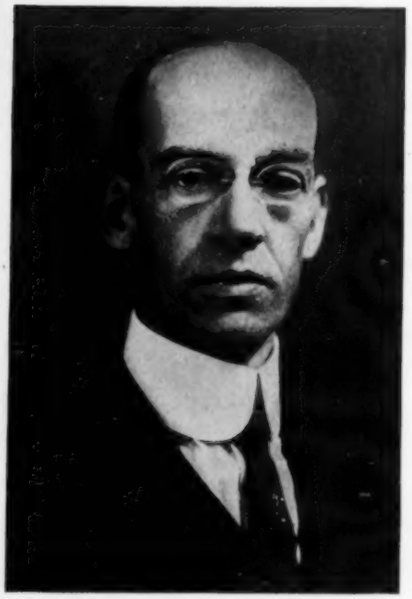
JOSEPH G. BUTLER JR.
Vice President, Brier Hill Steel Co., Youngstown, O.

EUGENE P. THOMAS
President, United States Steel Products Co., New York

"Iron and Steel Scrap", a subject which has never been discussed by the institute before, was handled by W. Vernon Phillips, president of F. R. Phillips Sons Co., Philadelphia. The rapid increase in open-hearth steelmaking capacity has given the old material industry an importance which is not appreciated generally. Mr. Phillips is an authority on the subject, and has been contributing his advice and energies to the most efficient distribution of scrap as a war necessity.

Henry F. Pope, president, National Malleable Castings Co., Cleveland, in an interesting paper on "Malleable Iron and Its Uses", described the physical properties of malleable iron and pointed out for what purposes it was superior to steel. Mr. Pope is the son of A. A. Pope, who was the founder of the National Malleable Castings Co., and has been identified with the malleable castings industry for many years.

HENRY F. POPE
President, National Malleable Castings Co., Cleveland



W. VERNON PHILLIPS
F. R. Phillips & Sons Co., Philadelphia

Sixty Years of Iron and Steel Making

Historic Survey of the Development of a Great Industry as Seen Through the Author's Personal Contact With the Men and Methods That Won the World's Supremacy for the United States

BY JOSEPH G. BUTLER, JR.

IN HONORING me with a place on your program, the committee evidently regarded half a century as long enough for any man to be actively engaged in the iron and steel industries. As a matter of fact, my experience in them covers a period of 60 years, for I became shipping clerk and assistant manager at the iron rolling mill of James Ward & Co., Niles, O., in 1857, after having spent three years as a clerk in the store connected with that enterprise.

These 60 years cover the greatest progress the world has ever known. They have brought forth so many startling discoveries, so many striking inventions, so many achievements enriching and broadening human life that merely to mention all of these would be a tedious task. Most of these were the work of American genius. They are the fruits of individual liberty and just reward for individual effort first known to the world after our forefathers had established freedom in enduring form upon this continent. The mere contemplation of this progress should serve to remind us of our obligations at this time, when civilization is turning the sharpest corner in its history, and when the right of men to self-government and self-development is threatened as it has never been threatened before.

Made Iron Without Coke

When I entered the iron business, we made iron without coke—a task resembling that of the Hebrews who were compelled to make bricks without straw. We had what would now be considered no ore, for the chief supply was derived from an occasional pocket in the hills or gathered from swamps or the beds of creeks. We had no furnace tops, no blast stoves, no hot blast as we know it now, no metallurgists, and, in the light of the present experience, no markets. We knew nothing of the value of gas, natural or manufactured, a fuel indispensable in the manufacture of iron and steel in large quantities. But we had grit and energy—the determination to do our best, and the same pride in doing things that we have now.

There were some compensations, of course. The payrolls were not so large and we were not troubled with a shortage of cars to move our product. I recently came across a statement issued by the superintendent of the Ward furnace, operated under lease at Youngstown, about the time of my entrance into the business. It reads as follows:

Youngstown, O., Aug. 25, 1853.
Messrs. James Ward & Company,
Gents.

Below you have the furnace proceeds for last week:

Aug.	Chgs.	Coal	Ore	Lime	Met.	Cstgs.
13,	90	400	480	160	7½	
14,	84	400	480	160	7	
15,	87	400	480	160	7½	
16,	87	400	480	160	6½	
17,	84	400	480	160	7	
18,	84	400	480	160	5½	3300
19,	81	400	480	160	6½	1500
	597	118½	143	48	47½	4800

Paid Men in Goods

The payroll referred to was for one month. The cash was needed to give some of the men a little money for some special purpose. As a rule, they were paid in store goods. Among some other furnace records of these days I have seen an entry reading:

"Paid James Dobson six dollars to git married."

At some of the furnaces in that locality it was the custom to give the men a dollar in cash at Christmas and the Fourth of July. At other times they got along without any money. From all of which it will be seen that many things, among them getting married and running a blast furnace, were done with less capital than at the present time.

There was at that time no thought of making steel at the ordinary iron works. The equipment consisted of one or more small heating furnaces, one or two trains of rolls, perhaps a forge fire or two, a few puddling furnaces and occasionally some machinery for making cut nails. The product was usually either simply pig iron or merchant bars, a commodity which, by the way, has not changed its name in the whole 250 years since iron was first formed by forging into that shape.

Bessemer Process Begins Era of Steel

The steel business was really born in America when the bessemer process came into use here, which was not until about 1864. The idea of removing carbon and silicon from blast furnace iron in this way was undoubtedly first conceived by an American, although he failed to develop the machinery for its use, and, as a consequence, reaped very little benefit from it. When William Kelly, who first decarburized iron by means of an air blast in a furnace he had erected for that purpose at Eddyville, Ky., about 1850, came to file his claim for a patent in 1856 he found that Henry Bessemer had filed similar claims and had been granted patents a few days previously. Kelly had worked for years on his scheme, which was indentical in principle, but he had not yet made it a commercial success and did not attempt to make steel in that manner. Nevertheless, his use of the pneumatic process first was not disputed and he was granted an interference as against the bessemer patent.

I recall distinctly a visit made by this man to Niles while I was a member of the Ward family, being em-

Tells Story of Industry

TO portray in an adequate manner and properly classify the historic events of the American iron and steel industry of the past fifty years requires an intimate contact not only with the business itself, but with the men who have brought about this marvellous development. The long career of Joseph G. Butler Jr., as an iron and steel manufacturer, has brought him in intimate touch with all the significant movements of a technical, commercial or political character which underlie this period of great expansion. To set down his personal experiences and observations dating from the days of pioneering to the present time of unsurpassed power is to sketch the story of the industry itself. This, Mr. Butler has done in his highly interesting and complete narrative, "Fifty Years of Iron and Steel".

A paper presented at the Cincinnati meeting of the American Iron and Steel institute. The author is vice president, Brier Hill Steel Co., Youngstown, O.

ployed in the Ward store, about 1854. He came there to enlist the interest of James Ward, then regarded as an authority on the iron question, in behalf of his experiments, and was a guest at the Ward table on several occasions. How far he succeeded in his errand may be judged by the fact that Mr. Ward said after he left that he was crazy.

The invention of the bessemer process, or rather its perfection and development, is generally regarded as the longest single step in the march of progress that has brought the iron and steel industries to their present stage, but there are other discoveries that seem to me even more important. We cannot make steel without iron, and therefore of even more moment than this invention were such things as the discovery of the Lake Superior ore ranges, the invention of the furnace top, the use of coke and its economical manufacture, the development of high blast temperatures, and especially in view of its recent rapid adoption, the Siemens-Martin open-hearth furnace.

Recalls Mushet's Discovery

As has been stated, I met Mr. Kelly when he was trying to make his great discovery a practical success. I saw him on a number of occasions later, when he was working to unravel the skein of litigation that tied up the bessemer process and prevented its adoption in this country until 10 years after it was patented here. I can recall the announcement in the technical journals of that day of the discovery by Robert Mushet, a Scotsman, that spiegeleisen would recarburize iron blown in a converter and thus produce steel. We did not know of this in America for some time after Mushet's patents were granted in England, which was in the latter part of 1856. Up to that time Kelly did not suspect that he had found a new way to make steel, and had urged his process on iron manufacturers only as a cheap and rapid method of purifying iron for rolling mills, claiming that it would take the place of puddling, something it has, by the way, never done.

Likewise I was privileged to watch every step in the development of the hot blast. At the Ward furnace at Niles, and in other furnaces in the valley, the blast was heated by passing it through cast iron pipes, and these lasted but a short time, their renewal and replacement keeping the local foundries busy and interfering seriously with continuous operation. We had what we called a hot blast, but it was really only warm in comparison with modern practice. The furnacemen tested its temperature with lead and zinc, strips of which were inserted at the point where it entered the furnace. If the blast melted lead it was not quite hot enough, and if it melted zinc it was too hot, so we believed, and would burn the iron. Between the melting point of lead and zinc, as we now know, there is a very considerable difference, so that our wind varied about as much in temperature as it did in pressure. If you reflect that the blast in those days was blown usually by an engine that had been worn out on a Mississippi river steamboat, and that it was a usual thing for the men about a furnace to operate the walking beam when the engine broke down, you will have some light on the strength and steadiness of the hot blast of that day.

It was about 1868 that the Player hot blast stove was brought from England to this country. It was a decided improvement. This stove introduced an innovation in being located on the ground instead of at the tunnel-head. The first stove to employ the regenerative principle was the Whitwell stove, and it was lined with fire brick, also a new idea. Both it and the Player stoves immediately increased the output of furnaces and made larger stacks possible, although it was many years before they supplanted the old Thomas stoves at many American furnaces.

The use of furnace gas for heating the blast in this country we owe to the Germans, the first effort to bring these gases down and burn them under stoves and boilers in America having been made by C. E. Detmold, a German engineer residing in New York about 1859. The new plan cost a good deal of money and was slowly adopted for that reason. We did not get to it in Ohio for some years after it was used in the east. I recall very distinctly the first furnace top installed at Youngstown. It was thought highly dangerous by the workmen, and there was at first some difficulty in getting them to work around the stack.

Furnace Sets Production Mark

With the use of better stoves and the introduction of more powerful blowing engines, furnaces began to grow in size and more attention was paid to their lines. It was realized that much improvement could be made in the output, and progress in this direction was rapid. By 1875 it was known that blast furnaces could be operated successfully up to 80 feet in height, and, with coke for fuel and proper equipment for blowing and heating the blast, could be made to yield much larger product than had been expected up to that time. But it was not until about 1880 that one of these larger furnaces reached an output much above 100 tons per day. This was the Isabella, located at Etna, near Pittsburgh. During three years, 1881, 1882, 1883, this furnace produced an average of 1090 tons per week—the best ever done by a blast furnace up to that time in this or any other country.

Old Stacks Were Picturesque

To those who have had experience only with the present day blast furnace and modern furnace practice, it is impossible to portray the conditions surrounding this industry at the time when I first became interested in it. The old stack of those days with its equipment would be picturesque in the extreme if it could be set up in the vicinity of a modern steel works. The stack was usually about 35 feet in height and built of masonry, lined on the inside with a poor quality of fire brick. It was square in section, on the outside, the bottom being about 24 feet each way and the top somewhat smaller, this depending on the opinion of the man who designed it. The stack was usually located against a bluff, the double purpose being to make construction cheaper by using the hill to reinforce one side and enable a patient mule to perform the functions of a skip hoist by dragging the ore to the top of the hill. A short bridge connected the stockhouse with the top and the material charged was wheeled from this point and dumped in at the open top.

Only one or two tuyeres were used, and these were often on the same side of the stack, next to the blowing engine. In front was the sand bed, into which the iron was run, and to one side the space reserved for roasting the ores. No water cooling devices were used except at the tuyeres and the opening in front. It was a very small proposition compared with what we are used to at this time, but was, nevertheless, a source of general public interest and regarded with considerable awe by the uninitiated. I can recall the first furnace in our district whose builders had nerve to locate it away from a hill. They used a hoisting device in which a tank filled with water raised the platform on which two wheelbarrows loaded with ore had been placed. When the barrows were dumped they were wheeled back on the platform, the water was let out of the tank at the other end of the rope and they came down to be refilled.

The blowing engines were of the crudest type and had but little power. There was then no method of gaging the pressure accurately and this was one of the cares of the furnace boss.

He was expected also to know when the furnace was ready to cast, the proper color of the iron, and a great many other things. As a rule, he did know these things better than might be expected, and these old furnaces made good iron even if they did not make much of it.

Even this type of furnace was a great improvement over those in use 40 years earlier in that locality, for these used the "trompe" or water blast, which was, you may be sure, somewhat removed from the Gayley dry blast. This was a contrivance by which a waterfall was made to carry air into a box, compressing it in the top, from which it was carried to the furnace through a small pipe.

It is a curious circumstance that the first furnace erected by the Carnegie Steel Co. was one torn down at Escanaba and taken to Pittsburgh. It had been erected in Michigan to be near the ore fields but its owners found that the problems of transportation could not be solved in that way alone. Scattered all over the eastern states can be found the ruins of once ambitious efforts to make iron cheaply by locating furnaces close to the ore. Some of the most pathetic failures, however, were furnaces placed, as their builders believed, close to both ore and fuel, and even to transportation. In the Juniata valley and the Allegheny mountains are many of these monuments to the realization that the problems of transportation are of great importance in the iron industry. These old stacks, built to defy the ravages of time, were placed where ore had been found and where wood was abundant for the making of charcoal. Most of them were built after the construction of the Pennsylvania canal and the Old Portage railroad, both huge enterprises for their day. But the canal has disappeared, the famous old railroad is nothing but a memory and these hollow structures of stone remain as mute witnesses of the fallibility of human calculations and the certainty of that change which is the seed of all progress and which is continually building on the ruins of the best efforts of men better things than those of which they dream. Huge trees may be seen on the tops of some of these old furnaces and around their bases the forest leaves have buried fragments of pig iron, which precious as it was, had to be left behind in the rapid march of progress.

Coal Caused Valley Development

About 1860 the first coke was regularly used as fuel in a furnace at Pittsburgh, and within a few years it proved so efficient that all other fuels were practically eliminated except for making special grades of iron. When I first became interested in the furnace business, all the stacks in the Mahoning valley, as well as those in Hocking valley, at Canal Dover and at several other points in Ohio were using raw coal. It was to a rich deposit of black-band ore found underneath the coal at Mineral Ridge, near Niles, and the equally important discovery at Brier Hill, in Youngstown, of coal making a fairly good fuel in its raw state, an almost natural coke, that the development of the iron business in the Mahoning valley was due. This coal, very similar to the Scotch coal afterward found in other parts of Ohio, was rich in carbon and low in ash, and in the hands of those who understood it, made a better blast furnace fuel than had yet been found at its low cost. For years it was mined close to the stacks and hauled by mules. All of the ore, usually a mixture of black-band, kidney and bog ores, had to be roasted before charging, and this was done with wood and coal in great heaps near the furnaces. The output of the four furnaces then in operation in that district was certainly not more than 200 tons per week. From this has grown a business employing 50 blast furnaces and producing during 1916 6,923,938 tons of pig iron. From the few small rolling mill plants then in that neighborhood have been evolved 46 modern rolling mills, rolling almost 4,000,000 tons of steel per year.

Early Development of Coke as Fuel

Owing to the advantage of this natural fuel, known as Brier Hill coal, we did not begin the use of coke in furnaces at Youngstown until 1869, at which time the coal began to grow scarce. An Englishman employed about one of the furnaces had some years previously made coke by covering coal in a heap, and this was used on occasions when a furnace went cold, but the raw fuel, the coal, was the main dependence until about the date mentioned, when we began to use beehive coke.

The employment of coke as a blast furnace fuel was an advance of such importance that it is worth while to refer to it somewhat more comprehensively. It was known in Germany and England long before its use anywhere in America, where charcoal was at first relatively low in cost. The date and place where coke was first used in this country are not entirely certain, but it was possibly tried in several places at the beginning of the last century.

It was my privilege to make the first contract for coke entered into by H. C. Frick when he began the coke business on his own account, and I would be ashamed to tell you the price, and I think he would also. I bought the first coke used in the Mahoning valley for a furnace at Girard then under my management. The exact date has escaped my memory, but it was in the late '60s. This coke was used as a mixture with Brier Hill coal, and some of the coal was still used as a mixture until 20 years later, when we could no longer obtain it in satisfactory quantities. The mixture made what we thought then was a very satisfactory and economical fuel, the coal adding to the surplus gas production. I have bought many thousands of tons of good beehive coke at 85 cents per ton. Hardly less important for the country than the addition to furnace output resulting from the use of coke is the rapid development of the by-product industry.

The development of the Lake Superior ore deposits has exercised on the iron and steel industries of the world an influence more far-reaching than any other incident in their history. Previous to that time furnaces and iron works had been located in many places where ore and fuel could be found. But the time had come when such resources were inadequate to meet the growing needs of the country. There is no question that, from the time of the discovery of the Mesaba range, civilization and progress received a tremendous impulse from the cheaper iron and steel it made possible. From this time it became evident that the production of these commodities had to be on an enormous scale, and that the day of the small furnace was at an end. It became evident also, that henceforth the industries must be confined to those localities where ore and fuel could be assembled in vast tonnages at low cost, and markets reached with the greatest facility. The first effect of this discovery was to practically limit the production of iron and steel in large tonnages to regions most accessible to great ore and fuel deposits.

Early Cost System Inadequate

Unfortunately I am not able to give the cost of ore at the furnaces of early days. The records then kept were imperfect in this respect and the dollar did not mean the same thing as it does now. But it was very high, in spite of the exceedingly low price of other commodities, and must have varied greatly at different furnaces, depending on whether it was mined from rich deposits or from those where it was poor in quality and limited in quantity.

The honor of discovering the ore deposits near Lake Superior is variously claimed. Some writers credit it to

government engineers who noticed a variation of the magnetic needle and investigated the cause. Others state that the Indians had found the ores and reported large masses of "iron stone" in that locality. I am inclined to think the honor belongs to Philo M. Everett who, in 1845, first located the Marquette Range in company with Indian guides.

Following the development of the Mesaba range came the astounding improvements in mining and transportation of ore which, together with the tremendous supply of that region, have had much to do with the phenomenal growth of the industries. In the old days men with shovels loaded the ore at the mines into small cars from which it was transferred to railroad cars. They handled it again the same way four times before it reached the furnace for even the hopper car had not then been invented. Aside from being the most laborious task to which a human back was ever bent, this was extremely costly and slow beyond your belief. Now we handle this vast tonnage entirely by machinery. The improvements in blast furnace construction and practice had much of their inspiration from these changes in the method of handling ores. With them came changes in size, lines and equipment. These changes were most marked during the period between 1860 and 1890.

The Development of Steel

Naturally, the rapid development of the iron industry was closely followed by an equally impressive growth in the production of steel. It is uncertain when the first "blister" steel was made in America, but we know that up to 1831 the total output had been less than 2000 tons, and that no crucible steel had been made here. In 1860 we were still dependent on Europe for practically all of our steel requirements. The bessemer process was then known, but as a dispute had arisen over its invention and an "interference" with the bessemer patents had been granted to William Kelly, the process was not put into general use in this country until after 1860.

As a matter of fact, neither Bessemer nor Kelly is entitled to the honor of inventing the bessemer steel process. Kelly, had, years before Bessemer began his experiments, conceived the idea of decarburizing iron by a blast of air, and had actually used the process in the making of iron which he used and sold in place of that produced in the refinery and run out fires then employed. Sir Henry Bessemer conceived the same process and carried it out with much more efficient mechanical appliance, which has been changed but little in general design to this day. But neither of these men was able to make steel. All they accomplished was to remove from pig iron the silicon and carbon. Robert Mushet was the man who first found out how to make bessemer steel by recarburizing the iron after it had been blown in a converter.

No less remarkable are the changes that 60 years have witnessed in the fabrication of iron and steel. When I first entered the business the plant of my employer consisted of a small blast furnace, a refinery forge or two and a mill upon which we rolled iron bars for various purposes. After the pig iron had been refined in the furnace—a process somewhat like that of puddling—it was rolled into muck bar. This was then made up into bundles, reheated and rolled on a primitive form of bar mill.

Wellman Developed the Open Hearth

There has been an impression that William F. Durfee had much to do with the early development of the open-hearth process in this country, but this seems to be an error. He was largly occupied with the bessemer process, but the credit of building the first successful open hearth of the Siemens-Martin type is due to Samuel T. Wellman, of the Wellman-Seaver-Morgan Co. Mr. Wellman built the first really successful American open-hearth furnace at the Bay State Iron Works, South Boston, in the latter part of 1869. He had been assistant engineer for J. T. Potts, who had been sent to this country by C. W. Siemens to assist in the starting of an open-hearth furnace at Trenton for Cooper, Hewitt & Co., which had bought the Siemens rights. This furnace had not been successful owing to trouble with the gas producers and other difficulties and was finally abandoned. In working on this furnace, Mr. Wellman acquired experience that made it possible for him to correct errors in design that had proven fatal to the Cooper-Hewitt experiment. It was at this plant also that the first ferromanganese was made in this country. The first open-hearth furnaces had a capacity of only 5 or 6 tons at a heat, and they had none of the mechanical appliances for pouring or for casting ingots now in use. Development both as to size and mechanical operation, has been gradual, and but little change has been made in the method of preheating the fuel gases.

Tariff Plays Important Part

To one who can recall the early years of iron and steel manufacture there is nothing more inspiring than the ceaseless effort of men engaged in the industry to find better and more economical methods of producing iron and steel. To this must be ascribed in large part the phenomenal advances made in America, which has led the world in the perfection of metallurgical processes and the adaptation of mechanical appliances for these purposes. In like manner there is no question that a part of the development was due to the tariff policy which for a great portion of this period encouraged enterprise by protecting the struggling iron and steel industries against competition from abroad and assuring reward for energy and ability expended in this direction.

You will pardon me if I claim some small part in this, for it was my privilege to be consulted freely by President McKinley during the period in which he labored so faithfully and effectively for wise tariff-legislation, as well as to enjoy his personal friendship and confidence during his lifetime as well as during his administration. One of the most gratifying tasks of my life has been the effort to repay in some small measure the debt owed by the industries of America to this statesman, whose broad vision had so much to do with our national growth, by conceiving, planning, and, with the help of my friends in these industries, erecting to his memory at Niles, O., on the spot where he was born and where we played together as boys, one of the noblest and most beautiful memorials on the American continent. I have had the honor to be consulted by the men who framed every tariff bill passed by a Republican congress since 1875, and have endeavored to consult the framers of every Democratic tariff bill during the same period.

Broad Vision of Leadership

Still more helpful was the influence of the organizations created and fostered by men of vision in the two industries. These men saw long before it came to be generally realized that the true basis of success in manufacturing enterprises was not so much unreasoning competition as sensible co-operation, and they early put their views into effect by the organization of such associations as the American Pig Iron association and the Bessemer Pig Iron association, both of which it was my privilege for many years to serve as president, the American Iron and Steel association, and our own great association, The American Iron and Steel institute. It would be hard for anyone to estimate what has been accomplished by these organizations toward the stimulation of progress and the conservation of resources in these two lines.

It has been said that "Youth longs, manhood strives and age remembers", and this is my excuse for indulging in

reminiscences before a body of busy men intensely interested in the present and the future. To me it seems that this future can be gaged accurately from the present and the past. The early days of ironmaking in this country are radiant with the spirit of progress and of patriotism. This spirit had no small part in making America monarch of all the forges, and it has not died out. We can depend on it to still preserve the wonderful lead we have attained in production, and to maintain the institutions to which we owe so much of all that is good for us and for the world.

In 1916 I spent six weeks in France and England with the American industrial commission. Had not what I saw there been sufficient to impress upon me the importance of the American iron and steel industry in the world's struggle against despotism and scientific barbarism, the statements made to me by the leaders of the French and English people would have done so. Without the magnificent resources of our mines and mills the allied cause would have been lost long ago. The genius, the energy and the rectitude of purpose that made possible the splendid industrial development of America has also made possible the preservation of democracy. There can be no doubt whatever on this point. Our government was not ready, but our mills were prepared. The biggest thing the kaiser overlooked was the American iron and steel industry.

Future Up to Coming Generations

It has been our great privilege to render aid on behalf of the world in the supreme hour of history. We are now called upon to make sacrifices in the same great cause recently brought more directly home to America, but scarcely more ours now than it was at the beginning of the war. That we shall do so with energy and devotion characteristic of our history and in keeping with our traditions I have not the slightest doubt.

Aside from this duty to aid our country in every way possible by the efficient operation of our properties and the ready co-operation with the government already shown, our chief duty, as I see it, is to preserve the traditions and continue the splendid record of the industries in our care. There is still much to be done. The limit of advancement has not been reached. In the future lies opportunity as great as that of the past. It must be grasped by younger men, for we older ones have reached the summit from which the prospect most alluring lies behind us. If the facts and reminiscences to which you have so patiently listened today give you inspiration to carry out the traditions and emulate the performance of the great industries in which you are fortunate to be engaged, they will have achieved their purpose and I shall have my reward.

Cincinnati and Her Varied Industries

BY DANIEL B. MEACHAM

CINCINNATI greets you cordially. We appreciate the honor conferred by the presence of this institute, with the attendance of men distinguished in the world of iron and steel. Your patriotic support of the government and your untiring, self-sacrificing efforts in assisting to prepare for and prosecute the war are well known. You are recognized as leaders in the humanitarian movements which are designed to improve the living conditions of your employes and to bring about a closer relation between capital and labor.

Every city has its individuality and its characteristics seem to be perpetuated. In a book entitled "Cincinnati in 1841", by Chas. Cist, is the following:

The whole mechanic interest here has long since discovered that if they meant to supply this market with what formerly came from the eastern cities, it would not do simply to make as good work, for the weight of prejudice and fashion was against them, and unless they could show an article which was manifestly of better materials, more neatly or more strongly put together and finished in a higher degree, they felt it was impossible for them to overcome the force of the current. We then made it a settled principle at all hazards and sacrifices to drive out the eastern article. We knew that we had as good or better materials; that the right kind of workmen could be got, and as long as we met our expenses we must for so desirable an object wait for our profits until we could carry our point. The best workmen were accordingly engaged and brought out at high wages, and every effort made to instruct our apprentices on the latest improved patterns and models, and in the course of a few years by the time our boys became journeymen, or went into business for themselves, we accomplished our purpose, and there is now not $5 worth of work brought out here where $1000 was imported ten years ago. The whole competition here is who *can* make the best piece of goods, not who *will* make the cheapest one.

The determination in 1841 to make only the best has been consistently adhered to by our manufacturers, and that is the reason why Cincinnati products are famous the world over.

Cincinnati occupies about 72 square miles, with a population of 410,000. Including the continguous cities on both sides of the river, the population of this industrial district is about 600,000. The United States census of 1910 showed that 79 per cent of the people were native Americans, which was a greater proportion than that of any other large city in the United States. In 1910 male aliens over 21 years of age formed only 2-6/10 per cent of the population. The principal products of manufacture are: Machine tools, soap, rolling mill products, clothing, boots and shoes, printing and publishing, slaughtering and packing, furniture, lumber products, leather, sheet metal, special machinery, printing inks, chemicals, woodworking machinery and women's wearing apparel.

A distinctive and unique feature of Cincinnati is its wide variety of substantial industries. According to the United States census of 1914, in this industrial district there were 2623 manufacturing establishments, and these included 92 of the 264 industries recognized by the census.

The National Social Unit Organization made a careful and widespread survey and selected Cincinnati as the most typical American city and one in which the citizens of all nationalities and beliefs worked in best accord for social betterment, and its first experimental station is established here. Our people have a firm conviction that the real success of an industrial city rests chiefly on a well educated, self-respecting working population. Many agencies are operating efficiently to bring about the results desired.

I could tell you of the historic past of our city and of its varied industries and achievements; of its place in the musical world; of its colleges and conservatories of music with thousands of students from the great south and southwest; of its unexcelled symphony orchestra and its music festival, which was the pioneer of those now held in various cities. Our zoological garden is said to be the best in the country. Our exposition was the forerunner of the one hold in Philadelphia in 1876, which had our director in charge. Our art school has started on their careers many of the most noted American artists.

A paper presented at the Cincinnati meeting of the American Iron and Steel institute. The author is partner, Rogers, Brown & Co., Cincinnati.

Part of Scrap in Steel Production

Importance and Extent of Old Material Industry Not Generally Appreciated—1917 Consumption Placed at Upward of 15,000,000 Tons Valued at About $400,000,000 —Problems of Collection and Distribution Are Discussed

BY W. VERNON PHILLIPS

I HAVE been asked to speak on a subject which, Mr. Farrell tells me, has never before been put before you, namely, iron and steel scrap, and I feel very fortunate in having the opportunity to tread on virgin ground. The subject, however, is such a broad one that I can only touch upon certain features. For the present my purpose shall be to acquaint you with the great importance of this too lightly regarded business—we cannot call it an industry, though it is fast approaching that stage.

Importance of the Business

But first let me point out its importance as a business. For instance, it is second only to pig iron in point of tonnage. The total consumption of iron and steel scrap in 1916, over and above that made by the consumer, was in excess of 12,000,000 tons, exclusive of cast iron scrap and material used for chemical and other unusual purposes, also exclusive of the large tonnage of borings and turnings used on the blast furnaces, all of which would make an additional 2,000,000 to 5,000,000 tons, but we are without figures, or the present opportunity to secure figures, on this tonnage; so we will confine our consideration for the present to the 12,114,000 tons consumed in 1916, which represents 9,646,617 tons of iron and steel scrap melted in open-hearth basic and acid furnaces, including a small tonnage which was used in electric furnaces. Of the balance, approximately 2,000,000 tons were worked in rolling mills by the various methods employed, namely, busheling, puddling, piling and direct rolling into bar iron and soft steel, while over 600,000 tons were converted by mills rolling old rails down to lighter sections, to angles, to concrete bars and including axles, shafting, etc., rolled to steel bars. During the present year the increased open-hearth capacity will probably have called for at least 2,000,000 tons more scrap than in 1916.

We have no means of accurately estimating the tonnage, but from the figures available, we can safely say that during 1917 there will be consumed over 15,000,000 tons of all grades of iron and steel scrap, valued at about $400,000,000; in fact, many of you will probably be surprised to learn that there are single companies doing an annual business of over $50,000,000, and a great many whose turnover exceeds $10,000,000.

You will see by now that my prime object is to impress you with the importance of this business, for the simple reason that it has been so hopelessly misunderstood, and it was not until the United States entered the war and began to take serious stock of itself that the subject was considered of sufficient importance to be recognized. As an illustration, when the sub-committee on iron and steel scrap was appointed in connection with the council of defense, one paper seriously remarked that even the humble scrap dealer was to be called on for help.

The Sources of Supply

There is also an erroneous impression regarding the source of iron and steel scrap and it is likely that no half a dozen men in the industry would figure the same way, but it is the opinion of authoritative judges that 25 per cent of all the iron and steel scrap is produced by the railroads, 40 per cent by the industrial plants in the form of new crop ends, structural crops, ship plate, stamping, turnings and borings, the other 35 per cent is shipped by scrap yards of which probably one-half consists of railroad and industrial scrap sent to the yards to be sheared and prepared, leaving 15 per cent to 20 per cent which is collected by the junk dealers. But while the collection of old agricultural house and city scrap represents a comparatively small portion of the entire production, it is at the present time a most important part, as *that* is the only source which can be increased. The railroads are producing less, due to labor conditions; Industrial plants can only produce scrap in proportion to the amount of the steel they receive; while all scrap which comes from replacements is smaller in volume, due to the great difficulty in replacing machinery or equipment of any kind. Besides, we are shipping millions and millions of tons of our steel out of the country, from which we are getting no scrap and will get no scrap; and, in addition, the trade is being called upon to ship thousands of tons of scrap itself. Italy in particular has been starving for steel scrap, and there has already been shipped out over half a million tons. The government has taken a hand in this, as it will in many ways, to regulate this business during the war; but if the war keeps up long we shall soon reach a point where iron and steel scrap will become a vital matter, and I want to use this opportunity to impress all of you with the importance of regarding this subject seriously.

Need of the Dealer

You are all either consumers, or producers of scrap. There are *millions* of producers and *hundreds* of consumers who are served by *thousands* of dealers who are in turn served. The hundreds have always used this great advantage to discourage and discredit the thousands by the very simple and though probably innocent expedient of buying something they want but something the dealer cannot always deliver. This is at the root of all the so-called dishonesty in the scrap business. In normal time the competition is very severe and scrap dealers go beyond their own powers in their efforts to please the buyer.

Scrap is not produced, it is a by-product or a discard of something and it can rarely conform to specifications calling for strict sizes, weights, shapes and characters, especially under existing circumstances, when the stock piles of the country have been depleted, with labor scarce and unwilling, and with shipping facilities so limited. Scrap has no value without a demand.

The value of iron and steel scrap is in exact proportion to the value of material it replaces. Thus steel scrap is based on basic pig iron and over the last 15 years has sold at approximately 10 per cent less than the delivered price of pig iron at Pittsburgh. In all other sections the percentage below pig iron has been greater, due to the increased cost of delivering pig iron and the fact that Pittsburgh is usually the highest market for steel scrap, it being the largest consumer and a relatively

A paper presented at the Cincinnati meeting of the American Iron and Steel institute. The author is associated with F. R. Phillips & Sons Co., Philadelphia.

smaller producer. All other grades of steel scrap down to light turnings are worth their relative value to No. 1 steel scrap; but scrap does not always bring its intrinsic value as it is entirely based on supply and demand. Steel scrap has frequently sold above basic pig iron, though not in the last few years, and there has usually been sufficient scrap to keep it well below its parity. Thus we come back to the same point that scrap is worth only the price that it will bring. It has no manufacturing cost basis on which to figure.

I have not touched on the grades, classes and specifications nor on the peculiar nature of this most interesting business. It is unlike any other large business. The competition is to buy, not to sell. There are a hundred different kinds of iron and steel scrap, and possibly a hundred different users. It is the business of a scrap dealer to know what each mill uses and wants and what each producer makes. People often ask why the seller does not buy back the scrap from his own steel; but only in rare cases can he use it in the form it is made, and even then some other user needs it more than he does and is willing to pay a higher price. There is a use for every kind of scrap made; and while economists are making this wonderful discovery, it has long been known to the scrap dealer and there is no such thing as waste today.

The successful scrap dealer must not only know his own business, but that of each of his consumers, and the better he is informed the better he can serve them. He has yards all over the country today that are really manufacturing plants representing millions of dollars of investment in land, buildings, shears, drops, cranes, presses, locomotives, magnets, etc., many of these yards representing an outlay of several hundred thousand dollars each. These yards are steadily growing and they will soon be supplying 50 per cent of the scrap requirements of the country. The old idea of storing scrap and selling on a high market has disappeared, at least for the present. The unprepared scrap comes in at one end, so to speak, goes through its various operations and goes out the other end prepared and ready for the charging box, rolling mill or foundry, as the case may be.

Malleable Iron and Its Uses

BY HENRY F. POPE

IRON, as it is run from the furnace and poured into the molds in the process of making malleable iron castings, is not malleable at all but is extremely hard and brittle. When broken, it shows a white fracture. But this brittle iron is of such composition that when subjected to the proper annealing heat for the requisite length of time, it is transformed into an iron with entirely different physical qualities. After annealing, instead of showing a white fracture it shows a black one, giving it the name of "black heart". This distinguishes the malleable iron made in this country from that made in Europe, which has a steely fracture, due to the fact that the carbon is almost entirely removed by oxidation in the annealing process. The black fracture of American iron is due to the fact that in the annealing process the carbon, which in the original casting was all combined, has been separated out by decarbonization and is now found as free carbon or graphite of non-crystalline form deposited between the molecules of the iron. This form of carbon is called by Ledebur "temper carbon", to distinguish it from its other forms. The presence of a large amount of temper carbon gives the material its black appearance.

The iron itself, therefore, is left almost entirely free from any combination with carbon and possesses the malleable quality of wrought iron. It can be bent without fracture and withstands great shock and stress without breaking. It has the superiority of wrought iron in the respect of malleability without the sometimes objectionable fibrous structure of that material.

Some one will say: "Why use malleable iron any more when steel castings may be had?" That is a plausible question, for great strides have been made in steel casting production and certain castings have been changed from malleable iron to steel with improved results; but there are several reasons why steel will never displace malleable iron for a multitude of articles. In the first place, in most cases if the steel could be produced in the form and section of the malleable casting, it would be more expensive and no better; for it must be remembered that while the tensile strength of malleable iron is somewhat below that of soft steel, its elastic limit is just as high, which means that it will stand just as much punishment as the steel. Furthermore, it is easier and cheaper to produce many articles in malleable iron.

Poor Standards Reflected by Some Makers

Malleable iron has, unfortunately, not been produced in conformity with the best standards by all of its makers, and the poor iron made by some has brought much discredit upon the industry as a whole. There is no justification for this, because the inferior metal can be so easily distinguished from the good by the examination of the fractures of removed test lugs. All important castings should have test lugs cast on them for this purpose. Many manufacturers have, however, for several years given serious scientific study to their product with wonderfully good results, so that from many of them malleable iron can now be obtained of uniform quality and of greatly increased tensile strength without any sacrifice of ductility; for one peculiar feature of malleable iron is that while the tensile strength increases, the elongation also increases. This is not characteristic of any other commercial metal.

There are two essentials necessary in the production of malleable iron. One is the proper composition of the hard iron and the other the proper heat treatment in the annealing process. With increased knowledge and with better practice, the former has been greatly improved and the latter is secured by a proper observation of the temperatures. The quality of malleable iron will doubtless be improved by the use of the electric furnace, which practically insures a proper mixture before the iron is poured, besides in addition eliminating many of the objectionable oxides.

Thus it can be seen that malleable iron has a usefulness which is entirely its own and which cannot be taken away. Years ago it began to be used advantageously for agricultural implements, all sorts of farm tools, wagons and carriages, harnesses, stoves, pipe fittings, and for many other purposes. Later, the railroads began to use it, for many parts of cars could be made lighter and less subject to fracture by the substitution of malleable for gray iron. The railroads also use it in places where the iron is exposed to the corrosive action of the weather, for malleable iron is as noncorrosive as any of the iron products and much more so than steel. More recently malleable iron has become popular in automobile construction.

A paper presented at the Cincinnati meeting of the American Iron and Steel institute. The author is president, National Malleable Castings Co., Cleveland.

Motor Driven Units Cut Steel Cost

The Author Traces the Development of the Electric Drive for Rolling Mills, Pointing Out the Difficulties That Were Encountered—States Average Power Cost Per Ton of Product

BY S. S. WALES

IN THE early nineties, the electric motor made its entrance into the steel works. At this time it was waging a doubtful combat for street railway supremacy with the cable and the mule, and much was being written in an attempt to prove that it was not as well fitted for the work as either of its competitors, which, at the time, probably was right. The first use of the motor in steel mills was on detached machines, capable of independent movement from a fixed base, replacing the rope and shaft drives for traveling cranes, as all other machinery easily could be handled by older methods. This innovation quickly was followed, however, by its use on feed and transfer tables between roll trains and on charging and drawing machinery at reheating furnaces. Those early developments were made with such apparatus as the double reduction and single reduction street railway motors which were entirely uninclosed, and the first totally inclosed types which had sufficient stray field to make sparkless commutation an impossibility. It is a great monument to the courage and confidence of all concerned that the electrification of steel works ever proceeded beyond that point, as at that time nothing could be seen ahead but trouble and delay.

About 1893, a new steel company was organized, and through the confidence of its projectors in the extreme flexibility of electric power and its ultimate reliability, it was made absolutely dependent on the electric motor in every department, even to the primary water supply for the whole plant. Although the motor was the most convenient source of mechanical power ever used in the steel works, it was then unadapted to this special service. It had not yet reached any degree of standardization, and mills were endeavoring to make certain standards to adapt the railway motor to mill service, which was found to be much the more severe of the two. Indefinite increase in size to save the motor from damage did not accomplish this object, but developed the radical difference between it and the steam engine it displaced; its enormous overload capacity resulting in the destruction of parts of the mechanism driven by the motor.

The designing departments of the electric companies and the operating electrical men in the mill were not agreed; some of the mill electricians taking the stand that it was preferable to build special motors for mill work rather than to rebuild the street railway motors received from the manufacturers. In this the operating electrical men were given the cooperation of the sales departments of two or three large manufacturers of electric apparatus, who brought the two factions together and laid the foundation of the modern mill motor.

Steel Mill Motor Drive Development

A 3000-kilowatt installation of 250-volt, direct current, electric motors for rolling mill drives was made in the rail mill of the Edgar Thomson works in 1905.

One of the latest nonreversing motor rolling mill installations was completed Oct. 15 *at the Homestead Steel Works, where a* 25*-cycle, alternating current motor is being used to drive a* 110*-inch plate mill. In the past* 10 *years* 170 *nonreversing motor, rolling mill installations of over* 1000 *horsepower capacity have been made.*

The first large Ilinger reversing motor rolling mill installation was made at the plant of the Illinois Steel Co. in 1907. *Fifteen units having capacities varying from* 8000 *to* 15,000 *horsepower are to be installed during* 1917, *and five having capacities of from* 9000 *to* 19,000 *horsepower are to be installed in* 1918.

Requirements of Mill Motor

The basic requirement for a mill motor is constant service, as in case of failure of even one of the auxiliary units, the whole mill is stopped. This type of service demanded a more rugged mechanical design throughout than the street car motor. Definite temperature limits were found necessary and embodied in all specifications sent out, as motors were at first sold on a temperature guarantee as high as 100 degrees Cent. on full load run.

Realizing the impossibility of absolutely continuous operation, the next consideration was to reduce the time lost by failure to a minimum. To accomplish this, it was early discovered that the motors should be so constructed that the damaged parts, or the entire motor, readily could be replaced and no repairs should be attempted in the mill. Careful attention to details was required to attain the present high standard which makes the modern mill motor the most convenient and dependable tool ever placed at the disposal of the engineer, as it is today.

The electric motor has been applied to every class of machinery used in the production and finishing of steel, although only recently has any one plant been equipped with electric power throughout. In the construction of new blast furnaces electrically operated auxiliaries almost universally are being fitted. Further, these auxiliaries are superseding those operated by steam or hydraulic power in existing plants wherever the changes required are not so radical as to make the first cost prohibitive. The automatic skip hoist, the ore bridge and transfer cars are all so familiar as to need no description. In the steel producing departments, cranes, charging machines, transfer cars, etc., are too common to attract notice, although some of the later applications, where the electric motor has replaced the hydraulic cylinder, such as ingot stripping, lifting furnace doors and tipping metal mixers and tilting furnaces, may still be of interest.

It is in the rolling mill, however, where the ruling spirit is mechanical power rather than metallurgical reactions, that the electric developments have naturally been most spectacular. Since its early application to cranes and charging machines, the use of the motor has been extended until now it drives almost everything, including the screw-downs and manipulator—applications which long and stubbornly were contested by the steam engine and the hydraulic cylinder. One of the later achievements of the electric motor is the direct operation of a large billet shear, abandoning the

From a paper presented at the Cincinnati meeting of the American Iron and Steel institute, Oct. 26 and 27. The author, Samuel S. Wales is electrical engineer of the Carnegie Steel Co., Pittsburgh.

use of the usual heavy flywheel and clutch, and starting the motor from rest for each cut. This shear has a maximum stroke of 8 inches and the entire apparatus reaches full speed while the shear knife is traveling ¼ of an inch.

Main Mill Drives

Having successfully been applied to all detail operations in the steel mill, the next natural step was its application to main mill drive, which always had been the ultimate goal of both mill electrical engineer and the manufacturer of electrical equipment. While the same flexibility and lack of reciprocating parts recommended it, several engineering drawbacks retarded the development for large units fully as much as the first cost of the motor itself.

Behind the motor was the power station, which was operated by the same general type of prime mover as that which the mill motor displaced, and although larger units could be used and shorter piping provided, still the engine troubles were really only transferred from the mill to the power house. The gas engine, with its multiplication of comparatively small units and high first cost, although adopted at several plants to generate current for mill operation, did not seem to be the proper solution. It would appear then that the greatest incentive to this development was the production of the large capacity, highly efficient steam turbine generator, followed by the increased size and efficiency of boiler units, which allows the delivery to the mill pinions, through the medium of the electric motor, of a mechanical horsepower at an expenditure of as low as 10 pounds of steam per hour. Since an economical means of producing large amounts of electrical power has been perfected, the application of the motor to main mill drives has been taken up vigorously, and great progress has been made.

Types of Mill Motors

The main mill drive motor is automatically divided into several types by the class of mill to be operated, such as constant speed nonreversing mills for plates, billets, structural shapes, etc., where the product is sufficiently uniform to have one efficient running speed; variable speed nonreversing mills, for wide ranges of products, such as merchant bar mills, and reversing mills, for blooms, slabs and universal plates.

The straight alternating-current induction motor is recommended by all the large manufacturing companies for nonreversing constant speed mills. It also is recommended as the simplest machine for that type of service. For the variable speed nonreversing mills, there is considerable divergence as to the method of producing the changes in speed, that is, the Kraemer system, in which the regulating apparatus is mechanically connected to and at times supplies part of the mechanical torque to the rolls by means of the regulating current, and which can be designed to operate either above or below, but not at synchronous speed, and the Sherbius system, in which the regulating apparatus is mechanically separated from the main motor and returns its surplus power to the line. The regulating apparatus in the latter system can be run at any point below, through and above synchronous speed.

SAMUEL S. WALES has been with the Carnegie Steel Co. since 1893 and has occupied various important positions during that time. During the two years, 1913 to 1915, he spent a large portion of his time in Europe on special metallurgical work with armor manufacturers. Mr. Wales was appointed to his present position in 1916.

Classification of Drives

For many mills where only small ranges of speed change are required, either of the above systems should be equally satisfactory, though it would seem preferable to do all the driving with one motor rather than to supply 5 per cent or 10 per cent of the mechanical power through the shaft of the regulating motor, as is the practice in the Kraemer system. Where wide ranges of speed are called for and the motor may be required to operate at or near synchronous speed, the Sherbius system would appear to be the most adaptable, for with the Kraemer system there will always be a region varying from 2 per cent to 5 per cent on each side of synchronism where the motor is unstable.

Compound and Shunt Winding

For the reversing mill, all are agreed on the flywheel motor-generator set (the Ilinger system), but some difference of opinion still is apparent as to the main motor in respect to the merits of compound or shunt winding. It is somewhat difficult to reason out the advantage of the compound winding on a motor for this service. It appears doubtful if there is sufficient time when the ingot enters the rolls, and the shock is thrown back on the motor, for the compounding current to overcome the reluctance of the magnetic circuit of the machine so as to have any appreciable effect in cushioning the shock. It is quite apparent, however, that in later passes, after the piece is well in the rolls, and the motor is called upon for power and speed, that the compounding will come into full action with a consequent decrease in speed, and a reduction in the tonnage output of the mill. It must of course be thoroughly understood that this compound winding is entirely independent of the inter-poles and the main pole-face windings, which are universally used by builders of large reversing motors for securing sparkless commutation by controlling the distribution and density of the magnetic field of the motor.

Basis for Rating

There is some difference of opinion as to the proper basis for rating these large motors. This is the cause of much trouble and annoyance to engineers and purchasers, as it is difficult to arrive at a comparative basis as to price and capacity. One manufacturer may rate his motor according to the maximum output based on its greatest ampere-carrying capacity with sparkless commutation, which may be three or four times the normal mill rating based on 35 degrees rise in temperature of any part of the machine. Another may rate on a definite temperature rise. In the absence of a definite basis of comparison, the purchaser is thrown back on the competitive manufacturer's guarantee that, regardless of ratings, their machine will do the work. When handled in this way, all specifications drawn up,

and preliminary engineering work done by the purchaser are wasted. An injustice may thus be done a company bidding on the size of apparatus asked for, but who could have possibly given a lower price on the size finally purchased, and the purchaser may buy something which, while adequate for past practice, may not have the margin desired or intended in the original plan for future developments.

On all auxiliary mill motors in modern practice it is customary to guarantee a maximum temperature rise of 35 or 40 degrees Cent. for a continuous full-load run, and it would seem that if such a standard is considered a necessary basis of safety after 20 years of mill electrical engineering, we should not abandon all precedent for a manufacturer's performance guarantee, which must be more or less intangible and cannot be measured. The best and most faithfully kept manufacturer's guarantee does not and cannot reimburse a mill owner for loss of time and tonnage while a mistake is being made good, and the mill electrical engineer is not true to his responsibilities if he allows any modification of what experience has dictated as the line of safety. It is to be hoped that all manufacturing companies and purchasers will be able to reach some equitable agreement on this vital detail.

Cost of Equipment

Although frequently stated offhand that the cost of equipment for electric drives, especially for reversing mills, is so far in excess of the cost for steam as to offset any saving in operating cost that may be shown, the statement does not appear to be borne out by a close analysis of the subject. For the straight running mills, the comparison of first cost of equipment may be less favorable to the electric drive than with the reversing mill.

With the steam drive, the boiler house must be located quite near the mill to avoid long steam lines. This often involves costly engineering details and does not tend to concentrate the plant. If condensing engines are used, the large amount of water required may have to be carried for a considerable distance to the engine. All of this is avoided with the electric drive, as the power station and boilers may be located at the most convenient place, not necessarily inside the plant, where fuel and water can be supplied at a minimum cost.

The large reserve in boiler capacity which must be provided to take care of the peak loads in an all-steam plant, will in most cases over-balance the first cost of the electric equipment. Even with the best arrangement of boiler houses and their complete interconnection, in effect, they must be widely separated when compared with the compact unit representing an electric power plant. In most cases it will be found that from three to four times the boiler capacity will be required for the same output with an all-steam equipment than with a complete electrically driven plant; the comparative first cost of which readily can be appreciated. An all-steam plant could be cited which could operate an electric power station four and a half times its total power requirements with the steam it now consumes.

Electric Power Utilized Per Ton of Product

Based on the number of kilowatt-hours utilized in supplying one ton of product and thereby obviating any consideration of differences in the cost of power, in works organizations and in accounting systems, the following figures showing the power consumption of motor-drives present an excellent means of comparison between steam and electricity in the production of iron and steel:

IRON AND STEEL PRODUCTION

Kilowatt-hours, per ton of pig iron	10.25
Kilowatt-hours, per ton of open-hearth steel	4.15

MANUFACTURE OF FINISHED PRODUCTS

Raw material inches	Finished material	Main rolls kilowatt hrs. per ton
Nonreversing Mills, Electric Drive		
7 x 7	30-pound rail	60
6 x 7	3½ to 8 in. angles	33
22 x 22	Standard rail	46
20 x 24	4 x 4 inches	31
Reversing Mills, Electric Drive		
20 x 20	5 x 5	25.5
20 x 20	8 x 8	17.0
18 x 20	4 x 4	26.0

In many cases, on nonreversing mills, 1500 to 2000 pounds of steam are required per finished ton for average sizes of structural shapes. This amount, if reduced to kilowatts on the high basis of 15 pounds per kilowatt-hour, would represent 100 to 133 kilowatts per ton against a probable figure of 30 to 35 kilowatts per ton for a similar electrically driven mill. In the above figures, the peak loads have not been considered, as in both cases they will be passed back to the boiler plant, the figures given representing the total power used for at least a week's run.

On reversing mills, the actual consumption of steam with electric drive will probably be about half of the equivalent steam drive, but in this case the peak load must be taken into consideration, as it may represent from four to five times the normal power required and in the case of the steam reversing engine, it must be absorbed by the boiler. With the electric drive, this shock is almost entirely taken up by the motor generator flywheel set which is interposed between the line and the main motor so that on an average only one-seventh of the peak load is thrown back on the boiler plant. Where a saving of three-fourths of the coal used for power generation can be shown, the substitution of electric power for steam becomes as much an economic necessity as the use of the by-product coke oven.

In Record Time

Gun Shop at Milwaukee is Completed —Won't Undertake Carriages

Milwaukee, Wis., Oct. 29.—The Wisconsin Gun Co., Milwaukee, organized by five big manufacturers of Milwaukee to handle a contract for building 1000 field pieces of the 3-inch type, 1916 model, for the government, expects to start active work on Nov. 1 and hopes to be producing three guns a day after Jan. 1. The company has erected a complete new plant, 130 x 300 feet, of brick and steel. It was built in record time by the Worden-Allen Co., Milwaukee, which completed the structure in exactly 51 days and was awarded a bonus, as the contract called for completion within 90 days. The tool room already is at work.

The proposal of the government that Milwaukee manufacturers also undertake the manufacture of gun carriages, so that the complete 3-inch ordnance would be built in this city, has had to be declined, as it was found impossible after an exhaustive investigation to undertake the work. No facilities are available in any shop of suitable size, and the equipment in none of them could be utilized for such heavy work. To build and equip a complete new plant was found to be not only inadvisable but almost impossible because of the difficulty in getting building materials, labor and equipment. According to reports, the gun carriage work will be done at the Rock Island arsenal and the carriages shipped to Milwaukee to be fitted with the guns.

The Bridgman Bros. Co., Philadelphia, which recently sold its plant to the government, has purchased from the J. G. Brill Co. the plant near Chestnut and Thirty-fifth streets, occupied by the Unit Construction Co. The building is 80 x 372 feet.

War Clause Hits Employer

Proposed Amendment to Government Contracts May Force Companies to Recognize Labor Unions—Washington May Settle All Strikes

Washington, Oct. 30.—Labor, laying claim to patriotic sacrifices as great as those made by employing industries, has been responsible for more than 500 strikes and controversies since April 6, the date on which the state of war with Germany was declared. In the same period last year only 144 strikes and controversies were recorded. The strikes this year have affected 1,029,671 men either directly or indirectly according to government figures.

This record of labor speaks for itself. The statement has been made time and again by employers that labor is taking advantage of the war to form a monopoly which would make it the most powerful organization in the country. Working conditions, increased wages and shorter hours are the chief points upon which demands have hinged. Perhaps included with these should be the demand for recognition of the unions.

Industry has, in most cases, as demonstrated in the larger strikes which have occurred since the war began, acceded to most of these demands. Accession came only after the government had been called in to settle the differences. In almost every case the government officials, on plea of necessities of war, practically have forced employers to surrender to employes.

The war industries board, a member of which is an official of the American Federation of Labor, and which is a subsidiary of the council of national defense, an advisory member of which is Samuel Gompers, president of the federation, now has before it the proposition of including in all government contracts clauses specifying the hours and wages of labor. The war department has been won over to the labor side and is strongly urging upon the steel manufacturers that all contracts have such a clause. But the clause not only regulates hours and wages but leaves a loop hole through which the government can ram down employers' throats recognition of unions.

The clause in brief is as follows:

In the event that labor disputes shall arise directly affecting the performance of this contract, the contractor shall address a written statement thereof to the chief of ordnance for transmission to the secretary of war with the request that such dispute be settled, providing all available information. It is stipulated and agreed that the secretary of war may thereupon settle or cause to be settled such dispute, and the contractor agrees to accede to and comply with all the terms of such settlement. If the contractor is thereby required to pay labor costs higher than those then prevailing in the performance of this contract prior to such settlement, a fair addition to the contract price of the articles shall be made therefor; but if such settlement reduces the labor costs of the contractor, a fair deduction shall be made from the contract price, all as may be determined by the contracting officers.

The clause speaks for itself. Manufacturers dealing with the ordnance department so far have withstood efforts to agree to inclusion of this clause. It readily can be seen that acceptance of such contracts gives labor the opportunity to go into all unorganized shops, organize the men, call a strike and in the settlement demand recognition of the union along with such other so-called relief as the union may think proper.

In the 500 strikes, which is the number up to Oct. 23, the government was called in on all of them. The government's record shows more than 100 a.e still pending, over 50 have failed of ajustment, and 48 others were left in a more or less adjusted condition.

Iron Workers on Strike

More than 800 structural ironworkers are on strike at the United States arsenal, Watertown, Mass., where an erecting shop, foundry, projectile machine shop, smithshop and several other buildings are under construction. The strike was precipitated by the fact that the New England Structural Co., which is erecting the steel work at the arsenal, is employing nonunion labor. The strikers want double pay for overtime and the employment of none but union men on the construction work.

Westinghouse Men Receive Another Advance

Twenty thousand employes of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will be given another increase in wages, according to an announcement just made. Effective Oct. 16, all employes observing shop hours, except munition workers, will receive an additional bonus of 10 per cent if they are on a salary or time rate basis, and of 7 per cent if they are on a piece, premium or task basis. The new increase involves nearly $2,000,000. Increases announced since the outbreak of the European war now amount to about 60 per cent of the former average compensation.

Market Swamped

By Inquiries for Phenol and Prices Rise—Government Buying

New York, Oct. 27.—Manufacturers of coal tar products have been swamped with inquiries for phenol this week, and the demand is of growing proportions so that prices not only have gone higher during the week, but still higher prices are foreshadowed. The last sizable sale of phenol this week was a block for delivery next spring, which went at 50 cents per pound. This figure now indicates the minimum on any shipment.

As a result of small quantities which were reported by the producers as available for purposes of the government, the latter has placed some further trinitrotoluol business this week, accounting for all the toluol which is to be had. All of the toluol output will be disposed of in this manner in the future, as soon as it comes into sight, so that no toluol will be available to the general trade unless government permits can be secured.

Several large sales of benzol were made this week but the general tone of the market continues weak since unsold stocks are of considerable proportions. A number of inquiries are pending but most of them are small. The market may be quoted at 44 to 49 cents per gallon for spot and contract. Solvent naphtha has been quiet and quotations are unchanged at 17 to 20 cents per gallon both for spot and contract. Sulphate of ammonia is practically featureless.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant	
Pure benzol	$0.44 to .49
Toluol	1.70 to 1.80
Solvent naphtha	.17 to .20
Per Pound at Producers Plant.	
Phenol	$0.50
Per 100 Pounds at Seaboard	
Sulphate of ammonia	$4.90 to 5.05

Contract

Per Gallon at Producers Plant	
Pure benzol	$0.44 to .49
Toluol	1.50 to 1.80
Solvent naphtha	.17 to .20
Per Pound at Producers Plant	
Phenol (nominal)	$0.50
Per 100 Pounds at Seaboard	
Sulphate of ammonia	nominal

Effect of the War on Export Trade

Foreign Outlet is Held Imperative to After-War Prosperity—Government Should Co-operate With Iron and Steel Manufacturers in Approaching Struggle for Share of World Trade

BY EUGENE P. THOMAS

FOREIGN trade instead of being merely a contributing factor has become an indispensable element of our industrial prosperity. Henceforth, we must accustom ourselves to regard it as vitally necessary to our material well-being, no less than to our national safety. We have come slowly to realize the significance of what is called "militant commerce". We understand, as we never did before, the consequence that its prosecution entails. In their penetration of the markets of the world, German manufacturers and merchants had behind them a government whose ideals of national greatness were purely military. German commerce was the advance guard of German conquest, and the sacrifices made to forward the one were regarded as a legitimate contribution in the progress of the other.

It was largely due to the reaching out of Germany toward world dominion that there took place in the latter part of the nineteenth century an abnormal development of the German steel industry—a development involving capacities far in excess of the apparent demand. This excess was, in some years, equal to 40 per cent of the total production, and for the surplus thus created markets had to be found without regard to the immediate profit they might yield. Hence, during the development of the American export steel trade of the 10 years preceding the war, we encountered constantly and everywhere the systematic sale of German steel at whatever prices the buyer was willing or able to pay—prices which, more often than otherwise, were less than the net cost of manufacture in Germany plus transportation charges. This was one of the results of the well-known German policy of "dumping", a means of securing undisputed possession of a given market and affording justification for the existence and expansion of capacity designedly greater than normal demand required.

While the prospects after the war of our export trade in iron and steel, and their manufactures are of present interest, due emphasis must be given to the part which metallurgy has played alike in provoking and in prolonging the present conflict. When the Germans seized and, in spite of the allied victory on the Marne, held the Briey basin, they expected the prompt collapse of France. This basin contained nine-tenths of all the French deposits of iron ore, and of 127 blast furnaces in active operation in 1913, 95 were in the war zone and in the possession of the enemy. Thanks to the British navy, France still possessed the freedom of the seas, and from England and the United States were poured in supplies of munitions of war pending the utilization of unworked deposits of inferior ore outside of Lorraine.

Industry Expanded Greatly

Stimulated by the demand created by the war, the productive capacity of this country has been enormously increased. The same thing has occurred, although not to so great an extent, in Great Britain, Canada and France, while new iron and steel industries have been created or expanded in other countries, as in Australia, India, China and Japan.

After the war we shall probably find ourselves with an annual capacity of 35,000,000 to 40,000,000 tons of finished steel, and if the domestic consumption is not greater than its maximum in the past, it will leave probably 8,000,000 to 12,000,000 tons to find export markets.

England, with 8,000,000 tons in excess before the war, will have 12,000,000 tons after it is over. The productive capacity of France and Germany must largely depend on the future of Lorraine and its ore deposits, as well as of the coal in the valley of the Sarre. In the event of the retrocession of both to France, her annual production of iron ore would be raised to 43,000,000 tons, while that of Germany would be reduced to 8,000,000. In addition, France would have a new annual production of 16,000,000 tons of coal.

Whatever the distribution of the European ore supply, it may be confidently asserted that our capacity after the war will represent nearly, if not quite, as much as that of all other steel producing countries combined. We shall thus be as urgently in need of foreign markets for our products as the Germans ever were. But there would seem to be no reason to apprehend the postbellum "glut" of steel which some pessimistic observers have prophesied, at least during the first few years after the advent of peace. The destruction which has followed in the track of war has been so thorough and widespread, the depletion of existing stocks so complete, and the suspension of antecedent enterprises so much the rule, as to preclude any doubt about the steelmaking capacities of the world, during the period of rehabilitation, being fully employed. In addition, the regeneration of the shipbuilding industry in this country will continue to provide a tremendous outlet for steel, and the coming demand for structural shapes may be partially gaged from the fact that building statistics show that new construction has been greatly curtailed, as a result of the war requirements. The same statement applies to Europe as a whole no less than to the more progressive sections of other continents, and there can be little question that after the war the demand for steel will be sufficient to keep the industry on a stable basis for a considerable period.

As for the prospects of the more distant future, there is one point which cannot be too strongly insisted upon, because it is frequently lost sight of, and that is the incalculable influence on the material development of the world of the conditions of peace. Take the one item of railroad construction, which in two great continents—Asia and Africa—has been heretofore dominated not by commercial but by political considerations. After the peace, which we are all agreed in assuming will not be a German peace, no cloud will rest on the international status of such an enterprise as the Bagdad railway. Its operation, as a purely business undertaking, will promote the construction of a network of railways in Persia. It will be linked with the Indian system on the one side and the completed Cape to Cairo line on the other.

It should be safe to predict that the 10 years succeeding the conclusion of peace will be such an era of rail-

road construction as the world has not seen. And, where the railroads go, into lands old and new, there will be created a demand for the utmost volume of manufactures in the service of an improved agriculture, of irrigation, of mining, of the utilization of water power, and of the processes of an expanded and diversified industry. No "glut" of steel should be apprehended in the saner, soberer and chastened world which will emerge from the stern ordeal of the awful struggle by which it is now convulsed, because what we call the process of reconstruction will simply be the beginning of an unexampled development of the productive energy of the newly enfranchised nations.

Must Organize for Common Purpose

But it should be recognized that our share of this process will be small or great in proportion as we are able to co-ordinate our vast and varied productiveness to a common end. The necessity of balancing imports and stabilizing exchange; the creation of an American merchant marine, the necessity of compensating the output of additional capacity by increase of exports, and the advisability of meeting the combination of our competitors in foreign markets by the use of similar weapons, would seem to be among the rudimentary requirements of the situation.

All of the European countries now at war will be under the most urgent necessity of exporting their products to the greatest possible extent as a means of rehabilitating exchange and of paying for needed imports. We may expect, as a consequence of the experience gained during the war, that the manufacturing nations of Europe will have learned the absolute necessity of organization, co-ordination and co-operation. If we are to meet them in foreign markets on terms of equality, it will be necessary not only that we establish methods of mutual co-operation, but that our government aid and protect us at least as effectively as our competitors will be aided and protected by their respective governments.

In this connection the following report of the committee of the British Iron and Steel institute on the reorganization of the British steel trade is of interest:

"It is clear to the committee that the one outstanding feature which has been revealed by their work, so far as it has gone, has been the eliciting of the almost unanimous opinion that if the steel industry in this country is to maintain its position, it must be by some great broadening of our commercial organizations that would lead to economies far and away outweighing any other element in the situation, and long ago realized and adopted by our foreign competitors. The view is held in trade circles that the industry can hardly hold its own in open competition with other steel-producing countries unless the contemplated scheme includes a central selling board under whose control orders would be allocated to the works in proportion to their capacity."

Our country has had to pay dearly for our abject submission to the decay of our merchant shipping in foreign trade. But the lesson has been learned and with it has come a recognition of these fundamental principles; we must be enabled to freight our products to foreign markets at a cost not exceeding that which will be available to our competitors, and this will be possible only if we have an American merchant marine unhampered by restrictions from which our chief competitors are free.

Big Railroad Era Near

"It should be safe to predict that the 10 years succeeding the conclusion of peace will be such an era of railroad construction as the world has not seen. And, where the railroads go, into lands old and new, there will be created a demand for the utmost volume of manufactures in the service of improved agriculture, of mining, of the utilization of waterpower and of the process of an expanded and diversified industry. No 'glut' of steel should be apprehended because what we call the process of reconstruction will simply be the beginning of an unexampled development of the productive energy of the newly enfranchised nations."—Eugene P. Thomas.

Manufacturers Have Assented to Price Fixing

The American steel manufacturer has not only been called upon, in common with his fellow citizens, to yield a large proportion of his earnings in the form of taxes for the common weal, but he has ungrudgingly and voluntarily assented to the fixing of fair and reasonable prices much less than those dictated by the natural laws of supply and demand. This sacrifice has been willingly made in order that our government and its allies, as well as domestic consumers, may be able to procure the material they need at prices based upon costs with a fair margin of profit. Demands aggregating millions of tons have already been made upon these manufacturers, to which absolute priority has been and will continue to be given in the execution of orders. The fact cannot be too clearly recognized by the country as a whole that, thanks to the unexampled resources and efficiency of the steel industry and the unswerving loyalty and patriotism of its officers and employes, the one great factor in the successful conduct of the war, aside from men and money—that is, munitions of steel—will be provided in any quantity that may be required.

Industry Has Demonstrated Loyalty

To this end the steel industry has cheerfully submitted to the partial abandonment of its ordinary lines of manufacture and, consequently, of the exploitation of materials of special manufacture required solely for domestic consumption, as well as the abridgment of its regular export business and to interference with the natural supply of materials required for its regular domestic trade. It is co-operating vigorously with the war trade board in respect to export control of articles which it is desired to conserve for allied or domestic use. It has voluntarily refrained, long before any embargo or license restrictions were imposed, from selling to neutral markets, at favorable prices, a much greater tonnage of steel which the world has demanded from us, because the industry realized the necessity of conserving a sufficient supply for the expected requirements for ships, for the allies, for our railways and any domestic use essential to ultimate war purposes. It has released its ships, when they could possibly be spared, to the shipping board to aid in the transport of troops and munitions; it has since the outbreak of the war and long before regulations were established as to trading with persons suspected of enemy affiliations, scrupulously withheld from any commerce with them, which might conceivably benefit the enemy. All of this, and more, is the rightful contribution of the industry to the prosecution of the war for human freedom. But it will not be considered as asking for more than its just rights if, when the war is over, and it has to face the reorganization naturally attendant on a return to normal conditions, it should demand that it be reasonably protected—upheld and encouraged in its efforts at home and abroad to maintain its business on a basis of just prices and equitable returns.

National Spirit Stirs Steelmakers

Realizing Tremendous Part American Steel Must Fill They Pledge Themselves to Produce to the Limit of Their Capacities as Their First War Duty—Patriotism the Keynote of Cincinnati Institute Meeting

AMERICAN steel can win the war and it is prepared to do its full duty. This was the message to the nation and to the world framed by the iron and steel manufacturers of the United States gathered for the thirteenth general meeting of the American Iron and Steel institute at the Hotel Sinton, Cincinnati, Oct. 25 and 26. The highest obligation of the industry was sounded clearly by its leaders and the greatness of the task was set forth in its true light. Accepting this supreme call to national service, the manufacturers dedicated the utmost of their individual efforts and of their plant capacities to the grim business of ending the war victoriously.

Patriotism was the guiding spirit of the meeting. It marked every address or discussion and it found its outlet in manifestations unexampled at similar gatherings. National and martial airs were sung at each session. The inspiring words of "America" were lifted at the morning meeting; in the afternoon, "The Red, White and Blue" was rendered; at the evening banquet, "The Star Spangled Banner" and other patriotic songs were given with a show of intense feeling.

Following a brief patriotic symposium at which leading producers spoke, Judge Gary called for a rising vote from those who were willing in order to serve their country to make all the iron and steel they possibly could turn out. Amid cheers, every man of the assembled hundreds rose instantly to his feet. "I never was so proud of the Iron and Steel institute as I am this morning," was Judge Gary's response. After the presentation of his annual address, which breathed of the need of unselfish devotion and loyalty to country, Judge Gary spoke informally of the war as the one subject now filling men's minds and called for expressions from different steelmakers. President James A. Campbell, of the Youngstown Sheet & Tube Co., said that nothing was worth while at present except the winning of the war. Robert Hobson, of the Steel Co. of Canada, Ltd., commended the "magnificent" silence of the press on the movement of American troops to the Atlantic coast and overseas. He said that 70,000 Chinese had gone through Canada to Europe, where they will be employed as laborers behind the trenches. James A. Farrell spoke of the importance of getting out as much steel as possible. He said 3,000,000 tons of shipping would be sufficient to support only 700,000 men in the field. "We must have twice that much," said Mr. Farrell. In introducing Mr. Farrell, Judge Gary spoke of the former having two sons in the army. The same was said of W. A. Rogers, who with C. H. Howard, J. G. Butler Jr., and others, also spoke.

Charles M. Schwab said that of 80,000 men employed and $600,000,000 of orders booked by the Bethlehem Steel Corp., 90 per cent is government business. He praised the attitude of Judge Gary in taking a broad view of the best interests of the country and of the trade rather than of the individual, when working out with the government at Washington the problems of the fixation of iron and steel prices.

Daniel B. Meacham, partner of Rogers, Brown & Co., Cincinnati, opened the formal program of papers by a hospitable address welcoming the iron and steel makers to Cincinnati. He briefly traced the scope and character of his city's industrial development under the subject of Cincinnati and Its Industries. S. S. Wales, chief electrical engineer of the Carnegie Steel Co., Pittsburgh, described and pointed out the advantages of recent installations of large electrical motors in rolling mills. This paper was discussed by Wilford Sykes, electrical engineer of the Westinghouse Electric & Mfg. Co., and by a representative of the General Electric Co.

Much interest was manifested in the address on Iron and Steel Scrap, by W. Vernon Phillips, president of the F. R. Phillips & Sons Co., Philadelphia. This was the first time the subject of old material and the different phases of its market had been presented before the institute. This concluded the morning program and during the noon recess the members were guests of the institute at luncheon, which was served in one of the hotel's dining rooms.

A very complimentary reception was given to Joseph G. Butler Jr. at the afternoon session when he rose to present his paper on Fifty Years of Iron and Steel. The institute manifested its appreciation of his many years of prominent and faithful effort to advance the best interests of the iron and steel industry, by warmly applauding him when he had finished. Henry F. Pope, president of the National Malleable Castings Co., Cleveland, outlined the development of the malleable casting industry and pointed out the uses and advantages of this foundry product. Interesting discussions on this subject were given by Enrique Touceda, professor of metallurgy, Rensselaer Polytechnic institute, Troy, N. Y.; Frank J. Lanahan, president of the Fort Pitt Malleable Iron Co., Pittsburgh; F. E. Nulsen, president of the Missouri Malleable Iron Co., East St. Louis, Ill., and J. S. Haswell, Dayton Malleable Iron Co., Dayton.

Export Trade as Affected by War was the subject covered by a paper by Eugene P. Thomas, president of the United States Steel Products Co., New York. Mr. Thomas' paper was followed with the closest attention because of the importance of his subject. The opinions he expressed regarding the tremendous demand for steel which will mark the reconstruction period made deep impression.

The spirit of patriotic fervor reached

its climax at the banquet Friday evening. Over 600 iron and steel men inspiringly sang national airs and vigorously applauded all thrusts at German autocracy and its crimes against humanity. Judge Gary, as presiding officer, called for a toast to the President of the United States, and as the diners stood in the darkened hall they were lead through the strains of the "Star Spangled Banner" while a lone spot light played on a fluttering American flag.

Congressman Nicholas Longworth, of Cincinnati paid a high tribute to the liberal support which the iron and steel manufacturers are giving the nation, both financially and in the matter of supplies.

How Ironmasters Built Monitor

Capt. R. W. Hunt, of Chicago, reminded the iron and steel men of the important service the industry always had rendered in previous wars. He gave an interesting account of the builders of the ironclad MONITOR and some of the little-known circumstances which surrounded her when she fought her famous battle with the MERRIMAC. On that occasion she was not the property of the United States government, since the latter lacked faith to support Ericsson's idea financially. It fell to two ironmasters, Griswold and Winslow, to carry on the experiments with their own funds, and it was in their rolling mill at Troy that the plates for the vessel were rolled. The MONITOR was on her trial trip when she encountered the MERRIMAC and the historic battle in the Hampton Roads resulted. Captain Hunt spoke of the seriousness of the shortage of farm labor and suggested the importation and employment of Chinese workmen, under government auspices, to fill this void.

George M. Verity, president of the American Rolling Mill Co., Middletown, O., made a plea for greater constructive co-operation among members of the institute. He said the problem of after the war was even greater than during the war and that the iron and steel makers must make themselves as efficient, if not more so, than any other people in the world. Stable industrial conditions should be established. To this end he thought all employers should act together and not individually in working out methods for the betterment of relations with the employes. He believed the institute could perform effective service by exchanging information as to how each producer had been working out this question and what he had been able to accomplish.

Clarence H. Howard, president of the Commonwealth Steel Co., St. Louis, spoke of the paramount importance of the railroad problem in this country. He said the iron and steel manufacturers had been prepared for war because of the policies of co-operation which they had pursued. The railroads, on the other hand, were poorly prepared for war and were unable to meet the demands laid upon them in the present crisis. Mr. Howard thought the time had come when the country must face the problem of helping to put the railroads in such a position where they can render fully the vital functions necessary from them in war or peace.

Charles P. Taft expressed the pleasure of the city of Cincinnati in entertaining, especially at this time, the representatives of the iron and steel industry. Frank Billings, of the Todd-Stambaugh Co., Cleveland, emphasized the problem of transportation, especially pertaining to iron ore and coal, under war conditions, and brought out what was being accomplished in the federal direction of lake traffic along these lines. He said the spirit of co-operation and of fair play which underlies these movements was making their success possible. R. W. Campbell, of the Illinois Steel Co., spoke on what constitutes true patriotism. James H. Dempsey, of Cleveland, and Harry C. Busch, of the Cincinnati Iron & Steel Co., Cincinnati, also spoke.

Following the completion of the prepared toast list, Judge Gary called upon a number of iron and steel manufacturers for impromptu remarks. Those who responded were Charles M. Schwab, Joseph G. Butler Jr., James A. Farrell and George P. Early.

Visiting members of the institute were accorded most hospitable entertainment as the guests of the iron and steel men of Cincinnati and vicinity. A special program for the ladies was provided. Various delegations spent Saturday morning on auto tours through the city and suburbs, winding up at the Cincinnati Country club for luncheon. In the afternoon, the private art gallery of Charles P. Taft was visited by many. The American Rolling Mill Co., at Middletown, also acted as host to a number of the iron and steel men attending the meeting. The trip to Middletown was made by auto Saturday morning and a tour of inspection of the company's plant was made. This was followed by a luncheon at the Elks club, at which President Verity addressed the guests on what his company is seeking to accomplish in its relations toward its employes.

The Cincinnati general committee on arrangements was headed by James I. Stephenson, president of the Cincinnati Iron & Steel Co., as chairman.

Members of Committee

The other members of the committee were as follows:

J. L. Adams, Cambria Steel Co.; A. L. Andrews, president, Newport Rolling Mill Co.; Joseph B. Andrews, president, The Andrews Steel Co.; L. A. Burrell, Sharon Steel Hoop Co.; Jomes A. Green, president, The Matthew Addy Co.; Edward P. Hettiger, vice president, Hickman, Williams & Co.; Boyden Kinsey, Jones & Laughlin Steel Co.; B. W. Lamson, manager, The Bourne-Fuller Co.; M. E. McKee, The Republic Iron & Steel Co.; J. M. Manley, secretary, Metal Trades association; Royal Mattice, American Steel & Wire Co.; D. B. Meacham, Rogers, Brown & Co.; Edward K. Morris, president, E. K. Morris Co.; Walter H. Murphy, president, The Union Iron & Steel Co.; Thomas Quinlan, manager, convention and publicity department, chamber of commerce; Wm. F. Robertson, president, W. F. Robertson Steel & Iron Co.; John Sargeant, president, The Domhoff & Joyce Co.; A. F. Scherer, Whitaker-Glessner Co.; Wm. T. Shannon, American Sheet and Tin Plate Co.; C. R. Talbott, president, The C. R. Talbott Co.; George M. Verity, president, The American Rolling Mill Co.; Buckner Wallingford, vice president, Walter-Wallingford Co.; J. G. Caruthers, The Carnegie Steel Co. The executive committee was composed of the following: Messrs. Stephenson, chairman; Lamson, Wallingford, Meacham, Caruthers, Verity and Quinlan, secretary.

Why Do You Fear Me?

At the banquet Friday night Congressman Nicholas Longworth in an unusually able speech outlined the financial problems of the government brought about by the war. At the same time he did not hesitate to pay his respects to some of the economic follies of the recent session. Mr. Longworth was followed by Harry T. Busch of the Cincinnati Iron & Steel Co.

"The attitude of congress towards business men," Mr. Busch said, "reminds me of the old time melodramas. You will recall how they went. In the first act the villain throws the heroine off the Brooklyn bridge; in the second he locks her in the deadly gas chamber; in the third he ties her to the railroad track. And then in the fourth act, with naive simplicity, he asks, 'Nell, why do you fear me?' "

Every Pound of Steel is Needed

Judge Gary Addressing Iron and Steel Institute Defines Present Loyalty of Manufacturers as Their Utmost Production and Their Subjection to Government Control—Discusses Different Aspects of Price Fixing

AT the last annual meeting of the institute reference was made to the appointment and the activities of a general committee and subcommittees of the iron and steel industry. These committees were appointed and were serving as auxiliary to the advisory committee of the council of national defense. However, in view of special legislation of a recent date concerning transactions of a business nature between the government and private interests, it was, from an abundance of caution, decided to abrogate the appointment of these committees; and immediately thereafter your president, after consultation with his associate directors of the institute, named a general committee and also subcommittees representing the different special lines of the industry. The general committee and also the subcommittees, directly or through the general committee, have been reporting their recommendations from time to time to the war industries board at Washington consisting of Frank A. Scott, chairman; Judge Robert S. Lovett, Messrs. Robert S. Brookins, Bernard M. Baruch, Hugh Frayne, Admiral Frank F. Fletcher and Col. Palmer E. Pierce. This board in turn has reported its recommendations to the President for decision. From the published accounts you are familiar with the results which have been reached.

Prices Disappointing to Many

Many of you were disappointed when the prices of the commodities in which you are particularly interested were announced. You had expected larger figures. You had been receiving from your customers, in the ordinary course of trade, much more favorable results. Your profits will be less than you have believed you are entitled to. Your costs of production and construction are increasing by leaps and bounds. Many manufacturers have struggled for existence in periods when business conditions were bad, trusting to the future for improvement, and they have argued that if the law of supply and demand should govern under such circumstances it should control at all times.

All these things have been considered by the iron and steel committees, and by the representatives of the government as well. It is only stating facts to say that the former have endeavored to represent the manufacturers conscientiously, intelligently and forcefully and that the members of the war industries board have at all hearings given patient attention, thorough investigation and careful consideration to every claim presented, with the sole purpose of doing justice both to the government and to the individual.

Think Prices Are Fair

THE members of our committees have insisted upon higher prices than the ones finally agreed upon but they consented to those which were fixed because they were influenced by motives of patriotism and also because they were convinced that, in the main, the prices came within the original proclamation on the subject by the President which, from the standpoint of the chief executive of the nation was reasonable. If, as between the different products, semifinished and finished, disparities in prices are discovered, then, so far as practicable, they should be removed. The intention of every one connected with the ascertainment of facts and the determination of prices is above reproach.

It may be suggested that some of the producers may realize larger profits per unit than others owing to greater diversity of commodities, favorable location, better organization, larger production or other facilities which tend to lower costs, but if so, the progressive rates of governmental excess profits tax, depending upon the relative net earnings of the different producers, will largely offset the differences in net results. It is estimated some of the manufacturers will be obliged to pay to the government as high as 50 per cent excess profits tax.

The committee representing the steel industry has labored hard and faithfully in the performance of its duties. It has carefully considered every suggestion which has been made, from time to time, by those engaged in the industry relative to their rights, interests and claims. The facts concerning capacity, advantages or disadvantages, and the claims of cost and profits of each, have been gathered, so far as practicable, with the purpose of determining the relative positions, rights and obligations of all; and these have been honestly presented to the war industries board, and, before their appointment, to the secretaries of war and navy and to various boards created by the President or by the council of national defense. The general committee has met frequently in New York and Washington, giving these matters attention in preference to all others and regardless of personal comfort and often without adequate rest. Omitting the chairman, who has been frequently relieved of work and favored in many ways, I state with emphasis for the benefit of those who are not fully informed that the other members of the general committee, as well as the members of the subcommittees, are entitled to the gratitude of all others who have been interested in this work. In the collection and distribution of figures affecting the different branches of inquiry the American Iron and Steel institute has rendered valuable assistance and is entitled to and has received much praise from the members of our committees and also from the government's representatives.

Vast Organization is Created

And the members of our committees, better than those who have not had similar experience during the last year, recognize with appreciation the comprehensive and efficient work that has been and is being done by the large number of governmental agencies in Washington. There has been created a vast business organization with scores of departments and a larger number of subdepartments, which are carrying on the greatest of all great business undertakings; and, notwithstanding the unfavorable criticisms which have been made, many, if not most of which, are wholly unjustified, it should, in truth, be said this colossal combination of diversified, ramified and intricate business activities, involving almost every

phase of political, social, commercial, financial and industrial life, is being, has almost been, whipped into a smooth running machine. That mistakes have been made, that steps have had to be retraced, that sometimes action has been too hasty and other times too deliberate, that red tape rules, created by legislation or otherwise, occasionally have interfered with the best results, may be assumed; but with patience, skill, persistence, vigor and success, the great varieties of business enterprise as time elapsed have been better and better co-ordinated and the whole structure developed nearer and nearer to the point of perfection. I do not hesitate to say that, so far as there has been opportunity to observe, the results in Washington have excited my surprise and admiration.

Business Men Serve Unselfishly

And the most wonderful feature of this work is not its magnitude, nor even its results, which are becoming exposed to the view of the general public but rather it is the fact that the work is very largely under the management of very able business men and women who are volunteers and are devoting their time and skill and energy without compensation or hope or desire for reward of any kind, except in the consciousness of duty performed. There are large numbers who have disregarded personal interests, their personal comfort, and many, even their personal health. These men and women are outclassed, in disposition to sacrifice and serve, only by the members of the army and navy who bare their breasts to the destructive forces of warfare.

Reference has been made to the general business organizations of the government and its membership for the purpose of suggesting to each of us present today our duty in this time of trouble and sadness; and to the character, disposition and qualifications of the members of the war industries board for the purpose of making prominent the inference that the steel committee could not, if it desired, secure from this board at any time a determination of recommendation to the President which was unreasonable; and that every one would be ashamed before such a body of men to urge any claim he did not believe to be sound and proper.

The war already has been long and terrible. The end is not yet in sight, although, of course, there is always a possibility of a sudden, if unexpected, break and collapse. Except on the basis of a conclusion satisfactory to the United States and her allies in this war, there is no prospect of an early termination of the war. It is clear we must prepare ourselves for a long and uninterrupted continuance of hostilities. The foe is strong and desperate. It must be overcome by physical strength and endurance, unless the masses of the people of Germany shall become acquainted with the facts and forcibly insist upon having a voice in determining the policy of the nation.

Allies Steel Advantage Threefold

The allies are possessed of the necessary elements of strength to win. They have at least three men against two and they are or soon will be more fit than the soldiers of the enemy, man for man. The next thing in importance is food. In this respect the resources of the allied countries for each person are far superior to those of the enemy. The next in rank of necessity is steel. Without this neither side could maintain an adequate offense or defense on any battlefield provided the opposing forces were well supplied. The allies have a productive capacity of steel three or four times as large as the central powers. Of course, with steel and what is produced from it, goes hand in hand the necessary explosives. But there is no lack of material to sufficiently provide.

Full Output is Duty

IF THE members of the Iron and Steel institute agree with what has been said thus far, as from a long and intimate acquaintanceship I believe they do, then it is easy to determine and to follow the lines of duty. We occupy a position of the highest importance in the present war. Our country and its allies in the international conflict are in need of every pound of steel which can be produced in this country and which can be used for war purposes. To insure this supply, every furnace and mill having relation to the subject must, without interruption, produce to the fullest capacity and subject to the control of the government through its lawfully constituted agencies. No excuse for neglect, delay or interruption will or can be accepted by the government.

Financial Power Will Tell

Underlying the utilization of all the military resources of the allies is the question of money and credit. The country which is greatest in finances, all other things being equal, will eventually succeed. The financial strength of the allied nations is many times greater than that of Germany and her allies.

The allies are in the financial condition to provide themselves with all these essentials, if they have the brains, the courage and the persistence. No intelligent person who is partial to the cause of the allies or who is entirely impartial in considering the merits of both sides will admit that there is any doubt the peoples of the allied countries are possessed of mental capacity fully equal to the peoples of any other country.

The administration desires and intends to pay fair and reasonable compensation, sufficient to maintain existing wage rates, salaries of officials and extensions necessary for war purposes. Up to the present time we have no reason to complain of the attitude and action of the government, although we have been disappointed in some respects. It is up to us to prove our continued loyalty to the government; but more than that, our loyalty to ourselves in the performance of duty. If there should be dissatisfaction concerning prices or the details relating to production or distribution of tonnage, production and deliveries must continue without interruption or diminution, leaving any question at issue to be settled at a later date. So long as the attitude of those in control of governmental affairs towards producers remains as it is at present, it must be the effort, as it will be the pleasure, of every one of the latter to do his part unselfishly, wholeheartedly and assiduously.

Defeat Will Mean Disaster

If our country is defeated in the pending military conflict your property and business and mine will be of little value. We will have retraced our national steps a century and a half. The wealth of the country would be seized and retained as prize money by other nations. We have been forced into the war and we are compelled to fight in defense of our persons, our property and our sacred honor. There is no escape. We are in the war to the end, however costly and bitter. No man, no country was ever engaged in a more righteous or a more compulsory defense. If we do not do everything practicable to uphold the hands of the President and to add to the success of the defense against the foreign aggressor we are less than men; we are weaklings; we are poltroons.

More Power for War Board Needed

Resignation of Chairman Scott Brings Up Opportunity to Recast Organization to Regain Business Confidence Lost Through Folly of Hobbling Section of Food Bill—Retiring Chairman Worked Under Strain

WASHINGTON, Oct. 30.—That the government should take advantage of the situation created in the resignation of Frank A. Scott from the chairmanship of the war industries board to organize its war machinery on a strictly business basis, is the opinion of business men generally. The vacancy in this important post, in their common judgment, demands not only an appointment of a man equally as strong if not stronger than Mr. Scott, but also calls for a cloak of greater authority than that which was given the late chairman.

This demand casts no reflection upon Mr. Scott, who ably served the country at great personal sacrifice, but it is an expression of dissatisfaction with the system under which he was forced to work and its resulting delays and uncertainties. Mr. Scott resigned because of ill health and Secretary Baker, chairman of the council of national defense, reluctantly accepted the resignation.

The strain of the duties, it is said, got on the nerves of the chairman of the war board. Outwardly all has been harmonious in the war industries board, but inwardly there is a great deal of friction and many petty jealousies. There always has been, and probably always will be, constraint between the army and navy when both are concerned in the same thing, but this is not responsible for the unrest in this very important organization.

Delay in Steel Prices Unexplained

Just why there has been delay in the naming of prices on finished steel products has not been disclosed but some are inclined to the opinion that these petty jealousies are to blame. It is a known fact that whatever the trouble may be with the war machinery that something must be done to re-establish confidence of business. The government made a great mistake when it let the Pomerene amendment, known as Section 3, get into the food control bill. This knocked out the splendid co-operative organization of the council of national defense and committees of representative manufacturers and business men. In the council's final admission that this amendment wrecked its organization the government formally acknowledged its mistake and was in a position to obtain greater confidence.

After weeks of delay in naming the prices on basic steel products during which time business was in great confusion, it appeared that the government had learned its lesson and was going ahead along systematic lines. Then came the still unexplained delay in announcing prices on pipe, wire, nails, sheets, rails, etc., which has again put business in general and the steel industry in particular in another hesitating and confusing position.

More Speed and More Men Needed in Ship Work

Washington, Oct. 30.—Whether America is to have more ships, a cry which has gone up everywhere, depends upon more speed and more men and no one realizes this more than the shipping board and the Emergency Fleet corporation. Every effort is being made to inject speed into the shipbuilding program and the great need of more men is a pressing problem. The construction program is about 20 ships behind schedule due chiefly to the lack of men and indirectly to lack of materials and poor yard facilities, betterment of which the board and the corporation are now seeking.

A conference of representatives of approximately 50 Atlantic coast steel shipbuilders has been called for tomorrow at which yard conditions and the labor problem will be gone over. This conference will be attended by representatives of the financial, mechanical and operative branches of the building companies. Chairman Hurley, of the shipping board; Admiral Capps, manager of the Fleet corporation; Assistant Secretary of the Navy Roosevelt; chiefs of the American Federation of Labor and officials of the department of labor. A meeting of lumbermen who are supplying timbers for the wooden ships was held yesterday.

Chairman Hurley says 300,000 men are needed immediately to carry out the construction schedule. These men, from wherever they may come, are to be worked in three eight-hour shifts. The board is anxiously awaiting a plan outlined to Provost Marshall General Crowder by which exemption from the draft may be given all men employed in shipyards.

Efforts being made in some quarters to stir up trouble in the shipping board, similar to that of the Goethals-Denman row, is attributed by officials of the shipping board and the Fleet corporation to disgruntled shipbuilders. There is no friction between Chairman Hurley and Admiral Capps. This is the declaration of both men, their friends and persons closely in touch with them. It is admitted that Admiral Capps has more work than he can manage with his present equipment and plans now are under way to expand the executive end of the corporation. Last week a committee of engineers was named by the admiral to assist him.

"If a corporation with $1,750,000,00 capitalization would attempt to do business with the organization we had when we took office they would not be able to sell a dollar's worth of stock," Chairman Hurley said. "Our organization has grown but not fast enough to meet the demands of the business we have in hand. We could get 100 men immediately to assist us but we must be very particular as to who these men are."

Virginia Furnaces Want Coke Rates Lowered

Washington, Oct. 30.—Reduction of the price of pig iron by the government is used for the first time as an argument for restoration of lower freight rates in a complaint filed with the interstate commerce commission by the Low Moor Iron Co., the Allegheny Ore & Iron Co., the Oriskany Ore & Iron Co., the Princess Furnace Co., and the Virginia Iron, Coal & Coke Co., a group of Virginia pig iron producers. The companies complain that the drop to $33 for pig iron, furnace, makes production more difficult and that an increase of from 20 to 100 per cent in the rate on coke from Virginia and West Virginia ovens to the furnaces is unjust. They say they are willing that the rates be increased but declare the new tariffs effective April 1, 1917, if maintained, will bring about a gradual decline in pig iron production in this district.

Completes Big Additions

Fore River Shipbuilding Corp. Adds Five Cruiser and Destroyer Slips and Augments Facilities for Finishing Ship Contracts

EXTENSIVE additions to the plant of the Fore River Shipbuilding Corp., Quincy, Mass., practically have been completed. The most important of these is a new machine shop for the manufacture of turbine engines. This building, which is 130 x 250 feet in size and about 40 feet high, has been completed and placed in operation. The building is almost entirely of glass with a framework of steel. The crane runways support two overhead cranes having a capacity of 10 tons, a span of 60 feet and a lift of about 28 feet. The building is heated by steam wall radiators. A section of the shop is partitioned off with wire mesh and is equipped as a tool room. The following machines have been installed for use in the manufacture of turbine engines:

One 9 x 13½-foot balancing pit.
One 5 x 5 x 20-foot planer.
One 5 x 5 x 14-foot planer.
One 12 x 16-foot laying out table.
Two 4 x 8-foot laying out tables.
One electric welding set.
One V stand for rotors.
Three blading machines.
Three balancing arbors.
Three large testing tables.
Three heating outfits.
Three 10-foot vertical boring mills.
Three 8-foot vertical boring mills.
Two 7-foot vertical boring mills.
One 6-foot vertical boring mill.
Five 42-foot vertical boring mills.
Two milling machines.
Two 5-foot horizontal boring mills.
Three horizontal boring bars.
One 3½-inch horizontal boring mill.
Four 36-inch x 24-foot lathes.
Two 27-inch x 14-foot lathes.
One 25-inch x 12-foot lathe.
Two 24-inch turret lathes.
Three screw machines.

A battle cruiser slip is nearing completion. It is 950 feet over all, and consists of 10 bays spaced 85 feet on centers. The distance between the inside legs of the towers is 131 feet. A 50-ton crane, with a span of 131 feet 6 inches, is operated at a height of 120 feet and 9 inches above mean low water. Twenty-five feet higher are three 7½-ton cranes of the same span. In two of the towers on opposite sides of the slip are installed two electrically operated elevators of 2-ton capacity each. The cages are 6 feet 6 inches by 7 feet 7 inches in size and run at a speed of 150 feet per minute. The keel blocks are of concrete made in 24-foot sections and are stepped down from elevation 33.15 feet, to elevation 8.40 feet; the overboard days are of the usual pile and timber construction and are pitched ½-inch per foot. In one of the towers of slip K at the north of the cruiser slip is a pump house of brick and reinforced concrete in which a 1000-gallon pump, designed to operate against a 100-foot head, is installed. This pump supplies salt water for testing purposes through 8-inch mains to supply lines carried on the cruiser slip structure. South of the cruiser slip are four slips served by two trestles constructed of wood and steel, spaced 112 feet center to center. Mounted on each trestle is a locomotive crane of 15 tons capacity. Each crane at present serves two torpedo boat destroyers under construction.

The boiler shop has been enlarged by a 60 x 120-foot addition and two additional overhead cranes having a capacity of 10 tons each, have been installed. To the machine tools in this shop 16 radial drills and two 7-spindle multiple drills, have been added. A new 1-story storehouse of wood and corrugated steel has been completed. This building is about 300 feet long, 90 feet wide at one end and 60 feet at the other. Another new 2-story storehouse of wood and corrugated steel, about 96 x 176 feet in size, with approximately 18 feet of headroom on each floor, has been completed. The second story will be equipped with a monorail system, while the first floor will be served by a spur track from the yard.

Obituaries

FRANK H. ZIMMERS, long prominent in Pittsburgh foundry circles, died at the Presbyterian hospital, Pittsburgh, Oct. 23, of pneumonia. He acted as secretary of the Pittsburgh Foundrymen's association since its organization more than 20 years ago. Mr. Zimmers was born at Blairsville 58 years ago. At the age of 16 he joined the engineers' corps of the Baltimore & Ohio railroad and after serving two years in this capacity, became associated with the Pennsylvania railroad, having charge as stationmaster of the Fourth avenue depot in Pittsburgh during the railroad riots in 1877. Returning to Blairsville, Mr. Zimmers engaged in the shoe business, which he conducted for eight years. Coming again to Pittsburgh, he became associated with the Union Foundry & Machine Co. and remained with that company until three years ago, when he resigned as its secretary. He then became affiliated with the National Steel Castings Co., New Cumberland, W. Va., as sales manager. He was also representative of the Weir & Craig Mfg. Co., Chicago. Later he organized the firm of Zimmers & Co., manufacturers and sellers agents for different lines of castings, machinery and equipment.

Sherman Blakeslee, president of the Blakeslee Forging Co., Southington, Conn., died suddenly at his home in Plantsville, Conn., Oct. 23. Mr. Blakeslee engaged in business in 1877 under the firm name of Blakeslee & Co., which later developed into the Blakeslee Forging Co.

Edward Weingartner, president of the Arrow Bolt Co., New York, and for 30 years a manufacturer of bolts and hardware accessories, died Oct. 26 at his home in New York.

Isaac Gerson, of I. Gerson & Sons, Toledo, O., died at his home in that city, Oct. 25. He established the company in 1885 to deal in scrap iron and metal. The company also operates the American Foundry Co., Toledo. Mr. Gerson was interested in the Detroit Metal Refining Co., Detroit.

Gen. John Thomas Wilder, soldier and pioneer iron manufacturer, died at his home in Chattanooga, Tenn., Oct. 22. He was a native of Green county, New York, and at the beginning of his career served seven years as an apprentice in the iron business. Following four years of active service in the Civil war he came to Chattanooga and in 1867 organized the Roane Iron Co. Two blast furnaces which he built at Rickwood, Tenn., are still in operation. General Wilder was president and general manager of the Roane Iron Co., owner of the Wilder Machine Works, manager of the Fentress Coal & Coke Co. and vice president and general manager of the Knoxville Power Co. He was a member of the Iron and Steel institute of Great Britain and the American Institute of Mining Engineers.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

ALLEN HOFFER, for three years superintendent of blast furnaces of the Worth Bros. Co., at Coatesville, Pa., has severed his connection with that firm to become associated with the ore sales department of the Cleveland-Cliffs Iron Co., Cleveland. This change will become effective Dec. 1. Mr. Hoffer previously was associated with the Warwick Iron & Steel Co. and the Eastern Steel Co. for eight years. While superintendent at Coatesville he supervised the construction of the new blast furnace recently built there.

J. Mathews has been appointed general superintendent of the Standard Steel Castings Co., Cleveland.

H. J. Wise, general sales manager for the American Refractories Co., Chicago, has resigned.

George T. Fonda, safety engineer for the Bethlehem Steel Co., at South Bethlehem, Pa., has been appointed director of labor and safety of all the plants of the company.

Col. Joseph Gilman Miller, retired capitalist and dealer in steel rails, St. Louis, has left for Russia as a special attache to Ambassador David R. Francis.

E. R. Swanson, formerly assistant superintendent of the Commonwealth Steel Co., Granite City, Ill., has been made superintendent of the Duquesne Steel Foundry Co., Coraopolis, Pa., succeeding L. A. Way, resigned.

Henry R. Swartley Jr. has been appointed manager of the government office recently opened in the Colorado building, Washington, by the Davis-Bournonville Co., Jersey City. The company manufactures oxy-acetylene welding and cutting equipment and oxygen and hydrogen producing apparatus, which is being used extensively by both the army and navy.

Harvey M. Clymer has resigned as assistant superintendent of the Lebanon Valley Iron & Steel Co., to become manager of the Pittsburgh office of Luria Bros. & Co., scrap iron and steel dealers.

Rollin C. Steese, director and former general manager of the Brier Hill Steel Co., Youngstown, O., has been named one of five members of the advisory committee of the Ohio fuel administration.

H. S. Bell on Oct. 15 was appointed secretary and assistant treasurer of the Wharton Steel Co., to succeed Harry C. Wenner, resigned. Mr. Bell's headquarters are at the Wharton Steel Co.'s office at 120 Broadway, New York.

CARMI A. THOMPSON,
Recently appointed manager of Tod-Stambaugh ore properties

Edward V. Stone, for 10 years fire prevention engineer for the Ludlow Mfg. associates, Ludlow, Mass., has resigned to accept a similar position at the new Squantum, Mass., branch of the Fore River plant of the Bethlehem Shipbuilding Corp., Inc., Quincy, Mass.

R. J. Morgan has been appointed supervisor of sales for the American Steel Export Co., New York. Mr. Morgan formerly was connected with the Midvale Steel & Ordnance Co. Prior to his association with the Midvale company he was connected for 13 years with the Carnegie Steel Co.

Ambrose Monell, who recently resigned as president of the International Nickel Co. to enter the war department, has quit the directorate of the American Reduction Co., the Haskell & Barker Car Co., the International Motor Co., the Midvale Steel & Ordnance Co., the American International Corp. and other corporations.

Harry A. Butz, chief engineer of the Donner Steel Co., Buffalo, has been engaged as resident engineer in charge of the construction of the iron and steel works which the Compania Siderurgica del Mediterraneo will build at Sagunto, Spain, and for which Frank C. Roberts & Co., Philadelphia, Pa., are the engineers.

J. D. W. Snowden, a salesman for several years for the Cambria Steel Co. at Cleveland, has resigned to become associated in the sales department of the American Steel Export Co., New York City. Mr. Snowden has been with the Cambria Steel Co. and the Midvale Steel & Ordnance Co. since 1902.

James A. Freed, employment agent for the mills of the Carnegie Steel Co., in the Youngstown district, has also been named land agent for the corporation in that district, having in charge the sale and rental of houses being erected at McDonald. A number of houses in the new steel town are already completed, some of them being occupied.

D. S. Guthrie, vice president of the Federal Export Corp., left New York, Oct. 19, and sailed from Vancouver, Oct. 26, for a six-months' trip in the Orient, during which time he will establish branch offices of the Federal Export Corp. He was accompanied by Guy L. Bayley and Burtin Honig, also of the Export corporation. Mr. Guthrie has traveled extensively in Europe for American steel interests, having lived abroad as resident sales manager for the National Steel Co. and the American Steel Hoop Co., Pittsburgh. Before joining the Export corporation, he was district sales manager for the Republic Iron & Steel Co. in St. Louis, Birmingham, Cleveland and Chicago. Samuel A. Benner, who recently was elected a vice president, will be in charge of the iron and steel department during Mr. Guthrie's absence. Both Mr. Bayley and Mr. Guthrie have spent several years in the Orient.

Men of Machinery Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

WILLIAM A. BATTEY, associated for many years with the Shepard Electric Crane & Hoist Co. as eastern sales manager and sales director, will sever active connection with the company on Dec. 1. He will retain his interest in the company, however, and continue as a director. Mr. Battey will start in December to devote his entire attention to the Pennsylvania Crusher Co., of which he is vice president. The Pennsylvania company manufactures hammer pulverizers, breakers and other special crushing machinery. W. C. Briggs, who for the past 10 years has been associated with the Shepard company's New York office as sales engineer, will become district manager. Robert T. Turner will join the New York organization on Nov. 1 as sales engineer.

G. E. Merryweather, president of the Motch & Merryweather Machinery Co., Cleveland, has been named to take charge of the machine tool section of the war industries board.

Arthur H. Medine, for the past eight years with the Norton Co., Worcester, Mass., has resigned to go with the Donora steel works of the Carnegie Steel Co., Donora, Pa.

Winthrop G. Hall, superintendent of the Spencer Wire Co., Worcester, Mass., has been granted a 10-weeks' leave of absence to enter Y. M. C. A. work at Camp Devens, Ayer, Mass.

George M. Hendee, founder of the Hendee Mfg. Co., Springfield, Mass., has accepted an appointment as assistant secretary for war work in France and will sail shortly.

J. J. R. Lawrence now is associated with the Motch & Merryweather Machinery Co., Cleveland. Mr. Lawrence formerly was with the Savage Arms Corp.

James T. Gratiot has terminated his connection with Fairbanks, Morse & Co., as manager of its Denver branch, to engage in work of a similar nature elsewhere.

Henry B. Joy, former president of the Packard Motor Car Co., Detroit, and H. W. Ford, of the Continental Motors Co., Detroit, are among a group of six Detroit manufacturers and business men who have gone to France to help direct the business end of the signal service.

Charles H. Colvin, who has been associated with the Sperry Gyroscope Co., Brooklyn, N. Y., for some time past has been made manager of the airplane department.

Rudolph H. Fox, research engineer of the Fafnir Bearing Co., New Britain, Conn., has been commissioned a first lieutenant in the ordnance section of the officers' reserve corps.

J. H. Coffey, on the completion of his fiftieth year as an employe of the Pratt & Whitney Co., Hartford, Conn., was presented with a gift of $250 in gold by the company.

W. S. Griffith has been appointed manager of the Worcester Machine Screw Works, Worcester, Mass. Mr. Griffith formerly was associated with the Heald Machine Co., also of Worcester.

E. Kennedy, formerly assistant general foreman at the West Albany shops of the New York Central lines, now is associated with the Chicago office of Manning, Maxwell & Moore, Inc., New York.

W. H. Bradley has been appointed assistant to the general superintendent of motive power of the Chicago & North-Western railroad. Mr. Bradley will make the Chicago offices of the company his headquarters.

H. W. Gaham has resigned as mechanical engineer of the Herman Pneumatic Tool Co., Zelienople, Pa., to take a position with the Ocala Iron Works, Ocala, Fla., as chief engineer.

Edward D. Feicht has taken a position with the Bridgeport Brass Co., Bridgeport, Conn., as assistant superintendent. Mr. Feicht formerly was with the Federal Dyestuff & Chemical Co., Kingsport, Tenn.

Lewis Russell is president of Russell, Holbrook & Henderson, 30 Church street, New York, which has been organized to succeed to the business of Lew Russell, Inc., manufacturer of machine tools and automatic machinery. Other officers of the company are: Vice president, C. H. Holbrook; secretary and treasurer, Lucien G. Henderson.

John H. Barker, formerly sales manager of the Diehl Mfg. Co., Elizabeth, N. J., manufacturer of electric motors, has established offices at 95 Liberty street, New York. Mr. Barker will engage in the sale of electrical equipment for factories.

H. F. Brandes has taken a position with the Springfield Mfg. Co., Bridgeport, Conn., manufacturer of emery wheels. For the past four years Mr. Brandes has been works manager of the Putnam Machine Co., Fitchburg, Mass.

Edward Stanverman has been placed in charge of the new branch sales office recently opened by the Worthington Pump & Machinery Corp., New York, in the American Trust & Savings Bank building, Birmingham, Ala.

J. C. Brekenfeld, who for some time was inspector of tools and machinery of the New York, New Haven & Hartford railroad, has been appointed assistant superintendent of locomotive shops, with headquarters at Readville, Mass.

N. C. Walpole, formerly southern sales manager of the Niles-Bement-Pond Co., New York, and the Pratt & Whitney Co., Hartford, Conn., with offices at Birmingham, Ala., now is a major in the ordnance department, having been granted a release from his duties as sales manager.

J. W. Lane, president of the E. W. Bliss Co., Brooklyn, N. Y., is chairman of the machinery and machine tool trades committee of the Liberty loan committee for the district of New York. The committee of which Mr. Lane is chairman was organized upon the suggestion of Governor Strong of the New York federal reserve bank, for the purpose of aiding in promoting the second Liberty loan bond issue. The committee probably will maintain its organization. Other officers of the committee include: Vice chairman, H. R. Swartz; secretary, George J. Low, and publicity manager, Charles A. Hirschberg.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted for Busy Readers

Steelmakers Attempt to Fix Profits Tax

NOW that the second Liberty loan has closed with overwhelming success, Wall street is giving more attention to other important matters, such as corporation earnings, excess profits taxing and the effects of price fixing. When it was first seen clearly, two weeks ago, that the loan was assured of widesweeping oversubscription, the stock market recorded a sharp advance from the extremely low levels of early in October. All the steel stocks joined in the advance, and last week showed further strength, although the advance was not so pronounced as before.

A number of iron, steel and allied industrial corporations have made public earnings reports recently all of which tell the same story of record earnings from the greatest prosperity of all time in the trade. Among the companies which have issued financial statements of late are the Republic Iron & Steel Co., which showed net profits for nine months of $21,861,000, from which was deducted a reserve for excess profits amounting to $8,636,000, leaving a surplus for the common stock of $43 a share for the nine months. The Bethlehem Steel Co., subsidiary of the Bethlehem Steel Corp., reported to the New York stock exchange earnings for the seven months ending July 31, 1917, of $32,792,348, with no allowance for depreciation, as compared with $55,615,626 in the full year 1916, before deducting depreciation. The Superior Steel Co. reported net income for the eight months ended Aug. 31, 1917, of $2,099,372; after deducting $597,947 reserve for the excess profits tax and making allowance for dividends on the first and second preferred stocks, showed earnings at the rate of $20.46 a share for the common stock. The Pittsburgh Steel Co. reported net profits for the year ended June 30, 1917, of $9,663,938; of this total $1,823,549 was laid aside as a reserve for war profits tax and $50,000 laid aside for Red Cross donations; the surplus remaining was equivalent to $101.09 a share on the $7,000,000 common stock, after dividends on the preferred stock. The Colorado Fuel & Iron Co. reported for the quarter ending Sept. 30, 1917, a surplus after all deductions except profits taxes, of $1,077,473, as compared with $909,224 in the corresponding period of 1916, and a deficit of $291 for the same quarter in 1915.

Estimating Excess Profits Tax

It will be noted from the foregoing that several companies have estimated the amount of their excess profits taxes for 1917. The Republic Iron & Steel Co.'s reserve for this purpose amounted to about 40 per cent of its earnings for nine months. The Pittsburgh Steel Co.'s allowance amounted only to 18 per cent of its earnings, but the taxes were figured only for six months, as the company's fiscal year ends June 30. A Wall street estimate as to the taxes on the United States Steel Corp.'s earnings for this year amounted to $86,350,000, on the basis of $440,000,000 net income for the year. As the Corporation laid aside $87,784,000 in the first two quarters of the year for contingent taxes, at this rate it would need make no further allowance in 1917.

However, estimates of excess profits taxes as yet seem premature. The executives of several of the leading steel companies state that they are unable to form an opinion, due to lack of knowledge as to what will be regarded as "invested capital". Until the treasury department and the commissioner of internal revenue make known their views on this subject, the question will remain unanswered as to what excess profits taxes will be levied on most of the steel companies.

Acquires Export Company

The American International Corp. has secured control of G. Amsinck & Co., Inc., New York, which recently has received considerable publicity from the activities of Adolph Pavenstedt, formerly head of its banking department, as a medium between the notorious Bolo Pacha and Count Von Bernstorff. The American International Corp. announces that although it has assumed direction and management of the Amsinck company, President A. Ruperti and Vice President Charles A. Holden will remain in charge. The board of directors, however, will be increased to seven, five of which will represent the American International Corp. The entire transaction was submitted to the war trade board and fully approved by that body, which has assurance that the affairs of the comporation will be conducted in full accord with the policy of the government and all orders and regulations of the authorities. The Amsinck company has about 5000 trading accounts in South America and Central America, and last year did a total business of more than $36,000,000.

Financial Crop Ends

The Milwaukee Tool & Forge Co. has taken over the plant and business of the Crary Tool Co., Milwaukee. The Crary company has filed articles of dissolution.

* * *

Robert Wetherill, president of the American Pipe & Construction Co., a $5,000,000 corporation, has been appointed permanent receiver of that company by Judge Dickinson in the federal court at Philadelphia.

* * *

The William H. Haskell Mfg. Co., Pawtucket, R. I., maker of bolts, nuts, etc., has purchased the property of the James Brown Machine Co., in that city, for $26,000. The property will probably continue to be occupied by the present tenants.

* * *

William F. Remppis, Ferdinand Thun and Lambert R. Behr, Reading, Pa., have reorganized the William F. Remppis Co., that city, and will secure a charter with larger powers. The company manufactures ornamental iron.

* * *

The Bostwick-Lyon Bronze Co., Waynesboro, Pa., has been formed by William S. Bostwick and Chester A. Lyon, formerly with the Magnus Co., Inc., Chicago. The new company has taken over the plant of the Waynesboro Foundry & Machine Co., and will manufacture brass castings, journal bearings and babbitts.

October's Tool Sales Set Record

Fore River Shipbuilding Corp. Commissioned by Government to Build $90,000,000 Destroyer Plant Issues Huge Lists—Builders of Cargo Ships Close Big Crane Contracts—Big Gun Orders Are Distributed

IN October, the machine tool and crane markets reflected clearly the rapid strides being made by the government in the various branches of its war preparations. Many new orders for munitions of various kinds were placed and these quickly resolved themselves into plant extensions and demand for additional equipment. By far the greatest single feature in this most unprecedented market was the rapid-fire action shown in the preparations for increasing the country's output of torpedo boat destroyers. The Fore River Shipbuilding Corp. was made an agent of the government to build a $90,000,000 destroyer plant, in which 46 destroyers will be laid down. The assembling yard will be at Squantum, Mass., near Boston; the turbine plant will be built in Buffalo and the boilers will be built in Providence, R. I. Orders for about 50 tools for the plate and angle shop were closed immediately and most of the total of about 80 cranes had been distributed by the close of October. The New York Shipbuilding Co., Camden, N. J., will build 20 additional destroyers; the Union Iron Works Co., San Francisco, 40; while the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., and the William Cramp & Sons Ship & Engine Building Co., Philadelphia, also shared in the new destroyer program. Equipment needed for carrying out this program was given precedence over practically every other class of government work.

Builders of Cargo Ships Figure in Market

Cargo shipbuilders continued a most prominent factor in the equipment market during October. However, the requirements of several vast enterprises which had previously seemed rather nebulous, assumed definite form during the month. Many orders for cranes and machinery were closed and others brought to the point of closing by the end of the month. The crane market, which had been particularly agitated by the pending mass of inquiry, has calmed down somewhat with the placing of many orders. With the crane builders it has become a question of deliveries rather than of orders. The American International Corp., building a yard for assembling standardized steel ships at Hog Island, Pa., closed for 500 steam hoisting engines and 500 steel derricks for this plant, with the American Hoist & Derrick Co., St. Paul, Minn.; it also closed for about 35 locomotive cranes. The Submarine Boat Corp., and the Lackawanna Bridge Co., which are building a similar plant near Newark, N. J., have closed for about six locomotive and five shop cranes. The Merchant Shipbuilding Co. and the Chester Shipbuilding Co., allied companies with headquarters at Philadelphia, closed for 13 electric cranes with the Champion Iron Works, Kenton, O. The Federal Shipbuilding Co. closed for fabricating shop equipment for its new yard at Hackensack Meadows, N. J.; it bought several locomotive cranes and issued a list of 10 electric traveling cranes. The Groton Iron Works, Groton, Conn., closed for three 10-ton traveling cranes, of 50-foot span. William Cramp & Sons Ship & Engine Building Co. closed for four locomotive cranes.

Numerous additional orders were distributed by the government for guns and gun parts. The Standard Ordnance Co., 115 Broadway, New York, closed for a number of tools for an ordnance plant in Hamilton, O. The Cleveland Ordnance Co., Cleveland, figured on additional equipment. The Edgewater Steel Co., Pittsburgh, issued a list of 58 large tools needed for machining 9.5-inch and 155-millimeter guns. The Watertown arsenal is increasing its capacity to build gun carriages. The Himoff Machine Co., Astoria, L. I., received an order for gun mounts and inquired for machines. The Symington-Anderson Co., Rochester, N. Y., which has a gun-machining contract, bought additional tools. The Bartlett & Hayward Co., Baltimore, was reported to have issued a large list of tools for gun work. The Camden Forge Co., Camden, N. J., figured on gun boring and turning machines. The Tacony Ordnance Co., Tacony, Pa., closed for 13 electric traveling cranes, with the Chesapeake Iron Works, Baltimore. The Tucker Supply Co., York, Pa., has an order for gun sights and has entered the market for equipment.

Airplane Makers Buy Equipment

Further buying for the airplane industry was done during the month. Orders for thousands of the new Liberty airplane motors were distributed. The Westinghouse Air Brake Co. received a contract to build 3000 motors at its plant in Wilmerding, Pa. The International Motor Co., Plainfield, N. J., bought equipment. The Lincoln Motor Co., Detroit, placed orders for its airplane engine plant. Nothing developed during the month of the inquiries issued some time ago by the General Vehicle Co., Long Island City, and the Simplex Automobile Co., Plainfield, N. J., for airplane engine work, which had attracted considerable interest in the trade.

Government Work Predominates

Other government work which was reflected in the machinery market included an order placed with the Forest City Machine & Forge Co., Cleveland, for 2,300,000 detonators for 3 and 4-inch shells; Charles L. Seabury & Co., Morris Heights, N. Y., received an order for five mine sweepers and entered the market for punches, shears, bending machinery, etc.; the American Gas Accumulator Co., Elizabeth, N. J., bought tools to fill a mine contract; the Worthington Pump & Machinery Corp. bought about $400,000 worth of equipment for making pumps for the navy; the American Motors Co., Pottstown, Pa., received a contract for 6-inch shells and inquired for about 40 tools; the American Car & Foundry Co. received a war order, for which it purchased 40 lathes and other equipment; the Recording & Computing Machine Co., Dayton, O., fuse manufacturers, inquired for 145 machines; the Savage Arms Corp. closed orders for about $200,000 worth of tools for its Utica, N. Y., plant.

Deliveries Become Dominant Issue

Extended Delivery Dates Harass Machine Tool Dealers—Priorities Business Congests Plants—Relief Expected Soon—Crane Builders Ask Washington for Help in Untangling Plant Operating Schedules

DELIVERIES are steadily becoming more and more the dominant issue in the machine tool and crane markets. Priority certificates have been granted on so many orders that some plants are booked for months ahead with so-called priority business. With the appointment of G. E. Merryweather, president of the Motch & Merryweather Machinery Co., Cleveland, in charge of the machine tool section of the war industries board, it is expected that many of the conflicts will be disposed of satisfactorily. With respect to cranes, however, the situation has been growing worse and recently the presidents of some crane-building companies have visited Washington to get assistance in untangling their plant operating schedules.

Shipbuilders Close Crane and Equipment Contracts

Most of the large new shipbuilding enterprises have closed or are about to close on their requirements for cranes and fabricating shop equipment. The Fore River Shipbuilding Co., which is building the new torpedo boat destroyer plant for the government at Squantum, Mass., has closed for most of the 80 cranes required for this work. It is understood that of this total about 10 are to be locomotive cranes, the remainder electric traveling cranes. One block of 27 traveling cranes was awarded to a Cleveland builder. The fabricating shop equipment for this plant was closed some weeks ago. The Federal Shipbuilding Co. has issued a list of 10 traveling cranes for its new yard at Hackensack Meadows. This company also closed for its fabricating shop equipment some time ago. The Groton Iron Works, Groton, Conn., has closed with the Erie Steel Construction Co., Erie, Pa., for three 5-ton traveling cranes. The Groton company, which has a contract for destroyers, is also buying punches, shears and other fabricating shop equipment. The New York Shipbuilding Co., which will build 20 destroyers at its Camden, N. J., yard, has bought a number of wooden derricks, instead of the four locomotive cranes on which it recently was figuring. The New York Shipbuilding Co. now is figuring on fabricating shop equipment. The Submarine Boat Corp. and the Lackawanna Bridge Co., which are building a yard near Newark, N. J., have closed for six locomotive cranes and five electric traveling cranes. The traveling cranes included four 5-ton cranes and one 15-ton crane, and were awarded to the Erie Steel Construction Co., Erie, Pa. The American International Corp., it develops, has bought about 35 locomotive cranes and is in the market for other equipment, including air compressors. The Whiting Foundry & Equipment Co., Harvey, Ill., has been awarded the contract for three 10-ton cranes for the new gun carriage shop at the Watertown arsenal, by the Stone & Webster Engineering Corp. About Oct. 31 the Stone & Webster corporation was scheduled to open bids on about 45 traveling cranes for the Watertown arsenal.

Export Business Increases

Machine tool dealers report a good export demand from all sections of the globe. Italy and Japan have been buying in good volume and little difficulty is being experienced in getting vessel space for shipments to these countries. Inquiries also are reported from South Africa, South America, Australia and India. The government is reported to have distributed a large number of new shell contracts recently and it is expected these will develop inquiries in the machinery market soon. Further ordnance contracts also are being distributed.

Shellmakers Search for Equipment

MACHINE tool equipment sales continue undiminished in number. The demand is mostly for heavy equipment. Tentative inquiry is being received from shellmakers for equipment to handle pending 6 and 9-inch shell contracts. One company practically has closed a contract for 6-inch shells, but has been unable to secure sufficient equipment. The equipment of the Drexel Motor Car Co., which was sold a few days ago, brought unusually high prices. Some of this machinery had never been used. Its immediate availability gave it a value above new equipment for which buyers must wait. As an instance of the range of price, one piece sold at $2750 on which the factory quotation is $2450. The Tri-City Steel Co., St. Louis, is about to build a plant at Madison, Ill., including a rolling mill. The Acme Steel Goods Co., Chicago, is building a 4-story plant. The Chicago, Burlington & Quincy railroad is preparing to build a machine shop at Clyde Station, Cicero, Ill. The Rock Island Plow Co. is erecting a machine shop. The Pawling & Harnischfeger Co., Milwaukee, manufacturer of cranes, is building an extension to its machine shop. Gary & Barsch, Seattle, are building a machine shop. The Mueller Mfg. Co., Decatur, Ill., will build a plant at Port Huron, Mich., including a rod mill and brass foundry.

Place Large Equipment Orders

HEAVY orders for machinery and machine tools have been placed during the past week by manufacturers in the Pittsburgh district who are engaged on government work. This business has been closed quietly, in accordance with the government's policy not to give out details concerning such transactions. It is understood that a great volume of the orders involve lathes, although large requirements for planers, shapers and forging presses also are understood to have been placed. Without exception, producers are asked to deliver machine tools at the earliest possible time. Prices are being maintained. One of the large buyers was the Edgewater Steel Co., Oakmont, Pa., which is engaged in producing rifles for the government.

Further Price Advances Are Made

DELIVERIES in the Cleveland market, as elsewhere, continue to be the source of much apprehension among machine tool dealers. As an instance, one dealer reports that his company is unable to make deliveries for fully 48 weeks on some equipment. This is a fair example of an order-choked market, which under priorities restrictions is doing its best to adjust

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Detroit Office: 326-27-28 Ford Bldg.,
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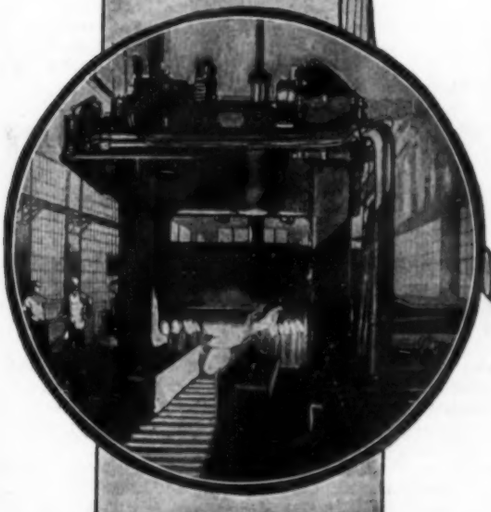
Cleveland Office: Hickox Bldg.,
The Hamill-Hickox Company, District Representative.

Chicago Office: 1370 People's Gas Bldg., 120 S. Michigan Blvd.,
A. Schaeffer, District Sales Manager.

Philadelphia Office: 603 Widener Bldg.,
Frank Wallace, District Sales Manager.

J. E. Dockendorff, & Co., 20 Broad Street, **New York,**
General Export Agents.



AGATHON STEELS
TRADE MARK

itself to the changed conditions. A few large lists which have been current in the Cleveland market are said to be of a tentative nature, being dependent upon the probability of the manufacturers receiving a government contract for munition work. No slackening in the demand for heavy equipment has been observed. Price advances are reported by one dealer, the machine tools affected being planers and heavy duty drills. Planers for January delivery have been advanced 10 per cent, while those for delivery in February have been increased 15 per cent. Heavy duty drills now are 10 per cent higher than a week ago, the same dealer reports. Further price advances are expected. The Erie Forge Co., Erie, Pa., and the Cromwell Steel Co., Lorain, O., are said to be negotiating for equipment. The Ladel Mfg. Co., New Philadelphia, O., is inquiring for a 36-inch planer. Equipment requirements of the Belmont Stamping & Enameling Co., New Philadelphia, O., include a punch and a shear. The Sharp Mfg. Co., New Philadelphia, O., has issued an inquiry for a 36 or a 42-inch open-side planer. The Tyler Tube & Pipe Co., Washington, Pa., is in need of an automatic gear cutter and a full-universal radial drill.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

BOSTON.—The Hoosac Lumber Co. has been incorporated to do ship construction with $600,000 capital by Huntington P. Faxon, Philip Atwater, and Robert H. Spare, Reading, Mass.

BOSTON.—The Boston Belting Corp. has been incorporated to make belting, mill supplies, etc., with $1,000,000 capital by Walter F. Lawton, Hermann A. Dolbeare and J. Sidney Stone.

BOSTON.—The General Appliance Co. has been incorporated to deal in machinery with $100,000 capital by George W. Boynton, William B. Marshall and James B. Brown.

BOSTON.—W. S. Crosby will erect a 2-story mill and storage building at 40 Foundry street, South Boston, Mass.

BOSTON.—Plans have been drawn for a brick addition to the factory of the B. F. Sturtevant Co., Damon street, Readville, Mass.

BROCKTON, MASS.—The Brockton Heel Co. has let the contract for a 1-story, 97 x 44-foot addition to its factory, a 1-story, 40 x 60-foot storehouse and a 1-story, 40 x 60-foot building at Riverside avenue and Plain street, Campello, Mass.

CAMBRIDGE, MASS. — The Blake & Knowles Works of the Worthington Pump & Machinery Corp. has let the contract for a 1-story, 80 x 120-foot foundry extension and a brick and concrete, 4-story, 65 x 120-foot building to take care of government orders.

CHATHAM, MASS.—The government has let the contract to Coleman Bros., Boston, for building and equipping a large aviation camp. The camp will cost several million dollars.

LYNN, MASS. — The William J. Nagle Machine Co. has been incorporated with $5000 capital by William J. Nagle, Herbert W. Simmons and Thomas F. Fee.

LYNN, MASS.—The General Electric Co. will build a wood and cement plaster, 1-story, 60 x 160-foot factory at its River works, West Lynn, Mass.

NORTHAMPTON, MASS. — The Victoria machinery with $10,000 capital by D. Edward Hennessey, Richard H. Dickson and F. M. Iron Works has been incorporated to make Hennessey, all of Holyoke, Mass.

REVERE, MASS. — The Adams-Holland Electric Co. has been incorporated to make machinery with $25,000 capital by James Buchanan Jr., and Alfred T. Timayenis.

SOMERVILLE, MASS. — The American Tube Works, Boston, has let the contract for a brick, 1-story addition to its service building.

WILKINSONVILLE, MASS.—The Springdale Finishing Co., Canton, Mass., has let the contract for a brick, mill construction, 3-story, 75 x 155-foot storage building to cost $50,000, to the J. W. Bishop Co., Worcester, Mass.

WORCESTER, MASS.—The Baldwin Chain & Mfg. Co. has let the contract for a brick, 35 x 52-foot addition to its plant on Chandler street.

WORCESTER, MASS. — The American Steel & Wire Co. will build a brick and steel, 2-story and basement, 40 x 90-foot addition at its south works.

WORCESTER, MASS.—The Osgood Bradley Car Co. will build a wood and steel, 1-story, 20 x 80-foot addition to its steel machine shop for the storage of iron, on West Boylston street, Greendale, Mass. The company has a $7,000,000 government contract for gun carriages and is in the market for machine tools, etc.

WORCESTER, MASS. — The Rockwood Sprinkler Co., of Massachusetts, will build a brick, steel and cement, mill construction, 2-story, 52 x 80-foot annealing house and carpenter shop on Harlow street.

WESTERLY, R. I.—The Federal Felting Co., Clark's Falls, Conn., is building a 2-story, 50 x 147-foot branch mill.

HARTFORD, CONN. — The Peter Frasse Co. is to erect a steel frame, 1-story, 50 x 162-foot manufacturing addition to cost $17,800 at 45-47 Boulevard.

STRATFORD, CONN.—The Raybestos Co., Bridgeport, Conn., has let the contract for a brick and steel, 1-story, 80 x 140-foot factory to cost $23,500 at East Main street and Sylvan avenue.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Whitney Co., 101 Park avenue, New York, has received the contract to build a power plant at the navy yard here.

ITHACA, N. Y. — The Thomas Morse Aeroplane Co. contemplates plant alterations.

NEW YORK.—The American Steel Products Co. has been chartered with $1,000,000 capital by W. S. Brewster, W. P. Kellett and W. B. J. DeLacey, 233 Broadway.

NEW YORK.—The Empire Electric Steel Corp. has been chartered with $500,000 capital by E. H. Rapp, E. Pusinelli and G. R. Hamilton, 2 Rector street.

NEW YORK.—The Spadone Machine Co. has been chartered with a capital stock of $20,000 by W. A. and A. A. and H. Spadone, 126 Duane street.

ROCHESTER, N. Y.—The T. H. Symington Co. has awarded the general contract for a 1-story plant addition to be 120 x 152 feet in size to the A. Friedrich & Son Co.

SCHENECTADY, N. Y. — The General Electric Co. has awarded the contract for constructing a drop forge building to be 80 x 400 feet in size.

SENECA FALLS, N. Y.—The Seneca Falls Mfg. Co. has been incorporated with $575,000 capital to make lathes and machinery. L. S. Chapman, H. E. Newell and H. J. Crane, Syracuse are the incorporators.

ALLENTOWN, PA. — The Jurnick Engineering Co. will build a 2-story plant to be 55 x 98 feet in size, and cost $8000.

CHESTER, PA.—The Aluminum Brazing

On account of having largely increased the capacity of
our plant for the next 12 months we have the following

OPEN TONNAGE

2500 TONS ANNEALED STEEL

3000 TONS MALLEABLE IRON

We want to contract this extra capacity.

Send us your requirements and specifications for prices.

Our STEEL has tensile strength of 80,000 lbs., is true to pattern and free from blow holes and it machines as well as a drop forging.

Our MALLEABLE has tensile strength of 45,000 lbs. to 53,000 lbs. and is thoroughly annealed.

THE INLAND STEEL CASTINGS CO.

Annealed Steel and Malleable Castings

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New York Sales Office
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GENERAL CASTINGS CO.
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Pittsburg Sales Office
RELIANCE MACHINERY CO.
207-8 Fulton Bldg.

Los Angeles Sales Office
ALLAN WETMORE
702 Spring St.

Say you saw it in THE IRON TRADE REVIEW

Co. of Pennsylvania, will build a 1-story building to be 35 x 60 feet in size and cost $6000. F. F. Davis has charge.

CORNWALL, PA.—The Badenhouse Boiler Co. will build a 1-story boiler house and engine room, to cost $10,000.

PHILADELPHIA.—Henry P. Friend Inc. has taken a contract to erect a 1-story, 64 x 99-foot manufacturing building for the General Mfg. Co. at Weccacoe and Snyder avenues.

PHILADELPHIA. — Stewart Bros. will build a manufacturing addition for Weir & Co. at Westmoreland and Jasper streets.

PHILADELPHIA.—Baxter, Kelly & Faust have let a contract to Fred A. Havens for the erection of a manufacturing building on Tioga street.

PHILADELPHIA.—The Ford Chain Block Co. has let a contract to the Raymond Raff Construction Co. for the erection of a machine shop addition at Diamond and Palethorp streets.

POTTSTOWN, PA.—The American Brass Products Co. has purchased the plant and business of the International Forge Co. All of the forge company's contracts will be completed.

BURLINGTON, N. J.—The U. S. Cast Iron Pipe & Foundry Co. has let the contract for a foundry addition to be 25 x 40 feet in size and cost $10,000, to the J. S. Rogers Co., Moorestown, N. J.

NEWARK, N. J. — The Barton Tannery Co., 310 Hunter street, will erect a 1-story steel foundry, 39 x 100 feet, to cost $20,000.

NEWARK, N. J.—The Newark Machine & Engineering Co. has been organized with a capital stock of $100,000 to deal in machinery. Emanuel P. Schock, Lewis Fisher and others are the incorporators.

NEWARK, N. J. — The Crocker-Wheeler Co. will build an addition to its plant on Fourth avenue for the manufacture of motor generators and electrical equipment. The new plant will cost $20,000.

NEWARK, N. J.—The United States Piston Ring Co. has been chartered with $100,000 capital to manufacture piston rings. The incorporators are Emanuel P. Scheck, Lewis Fisher and others.

NEWARK, N. J.—The Federal Tool & Machine Co. has been incorporated with $10,000 capital to manufacture machinery. Arthur Joseph and Ira Wollison, are interested.

NEWARK, N. J.—The Blevney Machine Co. has taken over the assets of John C. Blevney, manufacturer of grinding, polishing and finishing machinery, and will move the equipment to Greenfield, Mass.

NEWARK, N. J.—J. Wise & Sons Co., 33 Littleton avenue, has let the contract for a forge shop addition to be 22 x 45 feet in size and cost $5000.

NEWTON, N. J.—The Sussex Print Works, Sparta avenue, has let the contract for a 1-story boiler house, 50 x 50 feet, to cost $7000.

OXFORD, N. J.—The Oxford Foundry & Machine Co. has been incorporated with $50,000 capital to manufacture machinery. William A. Bartley, Howard L. Coas and Bernard Brady are the incorporators.

TRENTON, N. J.—Albrecht Pagensticker Jr. will build a 53 x 83-foot machine shop, to cost $7000.

DOVER, DEL.—The Birmingham Coal & Iron Co. has been chartered with $1,000,000 capital by Oscar R. Hindly, George H. Steiger and William F. O'Keefe.

BALTIMORE. — The Pool Engineering & Machine Co. has let the general contract for its projected ordnance plant, to the H. D. Watts Co., Garrett building. The plant is to be 154 x 400 feet in size.

BALTIMORE.—The E. J. Codd Co. has let the contract for a 2-story machine shop addition to be 50 x 70 feet in size and cost $7000.

NORFOLK, VA.—The American Chain Co., capital $1,000,000, has been incorporated and the construction of a $250,000 plant begun. Tazewell Taylor is president and R. C. Cole, secretary-treasurer.

PARKERSBURG, VA.—The Virginia Chain Co., capital $40,000, has been incorporated to manufacture chains. The incorporators are John Marshall, C. D. Ferrer, M. E. Hiehle, E. A. Brast and J. W. Romine.

PETERSBURG, VA.—The Virginia Copper Corp., capital $1,000,000, has secured a charter. The officers of the corporation are John L. Vaughan and S. C. Snead.

Activities in the Central States

CHIPPEWA FALLS, WIS. — The Multi-Color Printing & Machine Co., Minneapolis, Minn., organized recently by C. N. Galland, has established offices in the Rex building at Chippewa Falls, Wis., and may open its proposed plant in this city.

CLINTONVILLE, WIS.—Kuhn & Rosnow have been awarded the contract for constructing a reinforced concrete and steel bridge over Pigeon river in this city at $10,000.

FOND DU LAC, WIS.—The Elk Mountain Mining Co. has started work on a new mill at its mines in Kokomo, Colo., for concentrating silver, gold, lead and zinc ore. Frank R. Tabor is general manager.

KILBOURN, WIS.—The Marshall Mfg. Co., which recently built a number of Madden track-laying machines for shipment to France, has received another large order for machines for the Pennsylvania lines.

MADISON, WIS.—Architects C. W. & G. L. Rapp, 1005 Title & Trust building, Chicago, are ready for bids for the erection of a $150,000 theater and office building, 97 x 131 feet, for Dr. Wm. Gird Beecroft, on Mifflin, near Wisconsin street, Madison.

MERRILL, WIS.—A 2-story public garage and repair shop, 65 x 80 feet, will be erected at West Main and Genesee streets by Charles Aronson, automobile dealer and machinist.

MILWAUKEE.—The Packard Stoker Corp. of America has been incorporated with headquarters at Milwaukee and an authorized capital stock of $25,000 by James A. Packard, Charles B. Nehring and John L. Stelker, to manufacture and market automatic stokers and other mechanical devices.

MILWAUKEE.—The Kletzsch Realty Co., Milwaukee, is having plans made for a 5-story and basement reinforced concrete manufacturing building, 50 x 150 feet, to cost $150,000, at Fourth and Cedar streets.

MILWAUKEE.—The Reitman-Straus Co., 412 Railway Exchange, will erect a $25,000 garage and service building, 70 x 170 feet, fireproof, at Frederick avenue and Folsom place, according to plans prepared by Architect George Klenzendorff, 1015 Fourth street.

MILWAUKEE. — The Hazel Green Mine, Inc., capital stock, $10,000, has been incorporated by Frank Saxe, L. A. Olwell and A. G. Miller to operate a lead and zinc mine at Hazel Green, in southwestern Wisconsin.

RACINE, WIS. — The J. I. Case Plow Works is having plans prepared by Architect A. Arthur Guilbert for a 4-story warehouse, 105 x 125 feet, of brick and mill construction.

RACINE, WIS.—Articles of incorporation have been filed by the Electrical Construction Co., Racine. The capital stock is $18,000 and the incorporators are William B. Pierce and Charles F. Brietzke.

SAUK CITY, WIS. — Frank Geiger has awarded a contract to Joseph Dresen & Bro., for the construction of a public garage and machine shop to cost $15,000.

WAUSAU, WIS. — The Wausau Iron Works has been awarded a $59,900 contract for building a reinforced concrete arch bridge to be 400 feet long, across the Wisconsin river for the city of Wausau.

DETROIT.—The Lincoln Motor Co., Holden street and Grand Trunk railroad, is building a 5-story factory to cost $500,000.

DETROIT.—The Doble Detroit Steam Motors Co. has bought a site at Porter and Twenty-fourth streets and will build a plant for the manufacture of boilers and engines.

DETROIT.—The Detroit Processing Co. has been organized with a capital stock of $10,000 to manufacture chemicals and treat metals. T. W. Resch, C. E. Abraham and F. R. German are the incorporators.

LUDINGTON, MICH.—The Stearns Lighting & Power Co. has commenced construction work on a 33 x 67-foot electric lighting plant. The engineer and builder is the General Engineer & Management Co., 141 Broadway, New York.

PORT HURON, MICH.—The Mueller Mfg. Co. of Decatur, Ill., will build an additional plant at Port Huron, including a brass foundry 86 x 140 feet, a rod mill 80 x 100 feet and a power house, at an aggregate cost of $400,000.

CHICAGO.—The Stewart Mfg. Co., metal specialties and automobile parts, has commenced construction work on the first unit of its new plant.

CHICAGO.—The Dearborn Electrical Construction Co. has been incorporated with $30,000 capital by Charles Knudsen, Fred H. Bowen and Leon E. Delmar.

CHICAGO.—The Locomotive Appliance Co. has been incorporated with $5000 capital by H. M. Gale, J. F. Prell, and W. F. Mayer.

CHICAGO.—The American Machine & Tool Co. has been incorporated with $25,000 capital by Joseph Richer, Ernest E. Eklund and Carl D. Swanson.

CHICAGO.—The Acme Steel Goods Co., 2716 Farrell street, will build a 4-story plant 100 x 105 feet to cost $60,000.

CHICAGO.—The Lasker Iron Works, 1849 West Thirty-third street, will build a shop addition to be 30 x 40 feet and cost $5000.

CHICAGO.—The S. & S. Steam Superheater Co. has been incorporated in Delaware with $100,000 capital to manufacture boilers

A FEW OF THE SIMPLE JOBS—OUR WORK INCLUDES THESE AS WELL AS THE LARGE ONES

Our conception of an industrial problem is always the simplest structure: *the most economical in investment and operation for the required service.*

THE ARNOLD COMPANY

ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL

CHICAGO: 105 South La Salle Street NEW YORK: 111 Broadway

Say you saw it in THE IRON TRADE REVIEW

and superheaters by John C. Smith and Phillip Sulton.

CICERO, ILL.—The Chicago, Burlington & Quincy railroad, C. W. Newton, Chicago, chief engineer, will build a machine shop 41 x 121 feet at Clyde station.

MADISON, ILL.—The Tri-City Steel Co., 2021 Railway building, St. Louis, recently incorporated with $1,000,000 capital, will build a rolling mill to cost $100,000. J. A. Hyle is general superintendent.

PEORIA, ILL.—The Bradford Sales Co. has been incorporated with $25,000 capital to manufacture automobile parts by J. S., C. F., and H. S. Bradford.

ROCK ISLAND, ILL.—The Rock Island Plow Co. will build a 1-story machine shop 75 x 105 feet. J. F. Lardner, 600 Second avenue, is manager.

ANDERSON, IND. — The Lincoln Motor Truck Co. has been incorporated to build motor trucks and has taken over part of the plant of the Spring Steel Fence Co. The directors are Robert J. Walker, M. G. O'Brien, and Ernest Bartsch, Detroit.

AUBURN, IND.—The Sterlite Co. has been incorporated with a capital stock of $100,000 to manufacture metal specialties. Arthur Lehman, John Fletcher, Wayne Smiley, William Heider and Herman Thiel are the incorporators.

ELKHART, IND.—The Standard Ignition Co. has been incorporated with $200,000 capital to manufacture magnetos and other appliances by Andrew H. Beardsley, Martin E. Crow and Edward E. Zigler.

MILLER, IND. — The International Airship Corp. is building a 1-story factory 100 x 500 feet and a power house at a cost of $200,000.

TIPTON, IND. — The H. Clauss Cutlery Co. has been incorporated with a capitalization of $100,000 to manufacture machinery and tools. The directors are B. H. Adler, Lee F. Griffith, Henrie Claiss, G. D. Krebs, and H. R. Adler.

VEEDERSBURG, IND. — The industrial committee of the Veedersburg commercial club is to erect a stove foundry. The site has been purchased. A 1-story foundry room, 50 x 91 feet; a cleaning room, 30 x 31 feet; a machine shop and an office are to be built.

Western and Intermountain Territory

DULUTH.—The Marshall Wells Hardware Co. will build a factory to cost $70,000.

MINNEAPOLIS.—The Electrical Machinery Co., Tyler and Fourteenth streets, is planning an addition to cost $50,000, for which it will need additional equipment.

MINNEAPOLIS.—The Perfection Mfg. Co. will build a 2-story factory, 40 x 190 feet. James Nurock, 3600 East Twenty-sixth street, is general manager.

CLINTON, IOWA. — The Star Boiler Works, care S. E. Cullen, has awarded the contract for an addition to its factory.

DAVENPORT, IOWA. — The Blackhawk Airplane Co. has been incorporated with $100,000 capital by D. R. Lane, C. V. Dart and J. R. Lane.

DES MOINES, IOWA.—The F. M. Hubbell & Son Co. has awarded the contract for a 3-story garage. The estimated cost of the project is $75,000.

RIVERSIDE, IOWA.—The city is planning to build a waterworks plant to cost $40,000. J. M. Lewis is superintendent.

GALENA, MO.—A fund of $100,000 has been voted for building a waterworks system. Burns & McDonald, Kansas City, are the engineers.

ST. LOUIS.—The Schlueter Mfg. Co. is having plans prepared for a 2-story galvanizing shop and warehouse. C. F. May, 408 Merchants Laclede building, is the architect.

GAINESVILLE, TEX. — The Red River Bridge Co., H. W. Stark, president, J. W. Pigg, engineer, will build a steel bridge 1273 feet long, to consist of six 160-foot spans and a 273-foot approach.

CUSHING, OKLA.—The American Tank Co. has increased its capital stock to $40,000 and will add to its equipment.

HOBART, OKLA.—Citizens will vote soon on issuing $100,000 in bonds for waterworks construction. The Benham Engineering Co., Oklahoma City, is the engineer.

LINCOLN, NEBR.—E. G. Bohannon, Bohannon block, will build a 2-story machine shop to cost $12,000.

THOMPSON FALLS, MONT.—The Vermillion Silver & Lead Mining Co. is to build a new mill on Lyon creek at a cost of about $15,000.

DUBOIS, IDAHO.—The city of Dubois plans to build a waterworks plant to cost $25,000. Cotton & Wilson, Pocatello, Idaho, are the engineers.

HAILEY, IDAHO.—An election will be called about Nov. 15 on the proposed $90,000 bond issue for a power and water system.

SANDPOINT, IDAHO. — An election has been called by country commissioners for November 3rd to vote on a bond issue of $200,000 for road and bridge work. Included in the proposed improvements will be a $100,000 bridge at Clarks Fork.

Up and Down the Pacific Coast

EVERETT, WASH.—W. J. Rucker, local capitalist, reports that the Sound Paper Co. contemplates a combination mill and power unit. The pulp mill may cost in the neighborhood of $6,000,000.

OLYMPIA, WASH.—Bids for 68,972 pounds of I-beams and one 80-foot pony truss span will be called by the county commissioners Nov. 12.

PORT TOWNSEND, WASH.—The Union Timber & Products Co., Seattle, plans to build shipyards at Port Townsend.

SEATTLE.—A contract for the construction of five oil storage tanks for the Rogers Brown Co. on Harbor island has been awarded to R. I. Taylor at about $25,000.

SEATTLE. — The Puget Sound Traction Light & Power Co. has taken out a permit for the erection of a $20,000 building. The oil burning system at the company's power station is being changed to a coal burning system.

SEATTLE. — Fire recently destroyed the foundry of the Clyde Casting Co. on Spokane avenue between West Hinds and West Spokane street with a loss of about $5000.

SEATTLE. — Gary & Barash, 62 Gortoh street, plan to build a machine shop. The estimated cost of the shop is $15,000.

TACOMA, WASH.—The Oregon-Washington Railroad & Navigation Co. has awarded the contract for the construction of a round house on the tide flats to E. J. Rounds of Seattle at $7000.

HARRISBURG, OREG.—Crandell & Miller have moved their machine shop from Eugene to Harrisburg and plan to install new machinery in the new plant.

PORTLAND, OREG.—The Columbia River Shipbuilding Corp. has purchased a 7-acre site and plans to build an addition to its plant.

BURBANK, CAL. — The Moreland Truck Co. has awarded the contract for a 60 x 120-foot plant.

LOS ANGELES.—The Los Angeles Pump & Supply Co. has been incorporated with $15,000 capital by L. O. Clewett, Edward M. Smith and J. W. Harasta.

LOS ANGELES.—The Braun Corp., 371 New High street, manufacturer of ore crushers will build a 1-story plant.

LOS ANGELES.—The Palau Metals Co. has been incorporated with $10,000 capital to take over an existing plant by Charles A. Overmire, Edward F. Flynn and William Kennedy.

LOS ANGELES.—The K. O. Wetzel Co. has been incorporated to manufacture ornamental iron work by Kurt O. Wetzel, 912 North Soto street, and others.

LOS ANGELES.—The Moreland Truck Co., 1701 North Main street, is building a 1-story electric steel foundry, 60 x 120 feet.

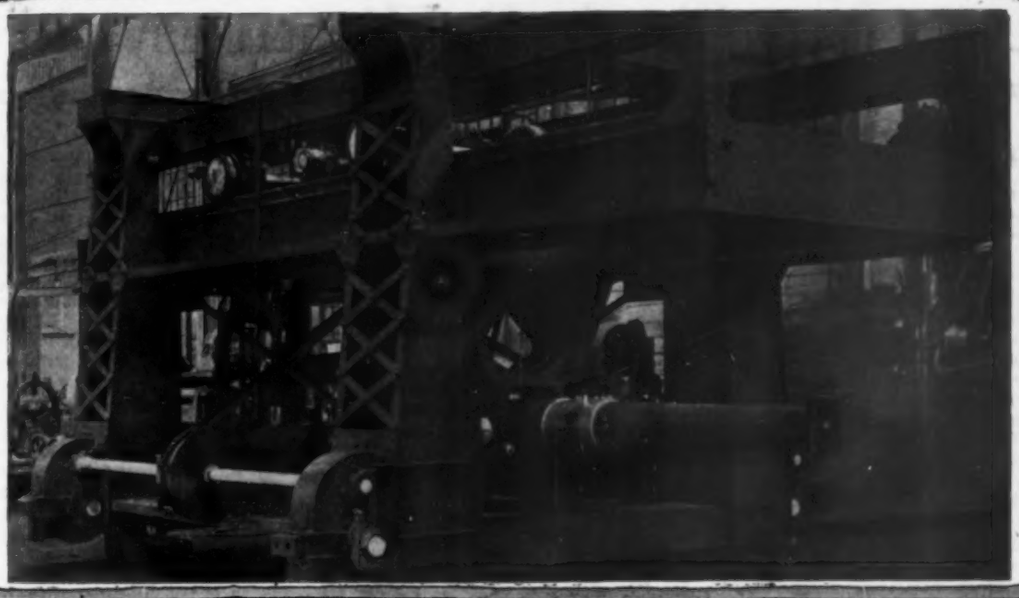
OAKLAND, CAL.—Walter Arnstein, 2211 Washington street, has had plans prepared for a 71 x 125-foot garage to cost about $20,000.

OAKLAND, CAL.—The Murray Mfg. Co. contemplates the construction of a machine shop. M. S. Murray is manager.

SACRAMENTO, CAL. — The Globe Iron Works will build two reinforced concrete shop additions, each 50 x 300 feet.

SACRAMENTO, CAL.—The Liberty Iron Works, recently incorporated with $280,000 capital, will build two factories for the manufacture of airplanes.

SAN FRANCISCO.—S. A. Michler will build a 2-story foundry and machine shop to cost $10,000.



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Wellman High Type Open Hearth Charging Machines, such as pictured above, may be found in daily operation in England, Scotland, Wales, Russia, Belgium, France, Germany, Sweden, Spain, India, China, Japan, Mexico, Canada, and throughout the United States.

Such an extended field of use can indicate but one thing: that there are elements of superiority in these machines which appeal to discerning buyers of equipment.

Specify W-S-M made Chargers, Cast Steel Charging Boxes, Manipulators, etc.

Send for folder telling how four Wellman High Type Chargers have saved the Homestead Steel Works $4,761,850.00 in their twenty-two years of constant service.

Principal Products of The W-S-M Company

Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product
Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

New Trade Publications

MIXERS.—A folder describing and illustrating mixers of concrete was recently published by the Blaw-Knox Co., Pittsburgh. In this type of mixer the aggregate rides up on the blades, is thrown against the revolving door and falls back again into the central mixing zone. Illustrations show one of the mixers at work on a large concrete building.

INSULATING UNITS.—A 12-page booklet describing "Di-el-ite," an artificial insulating stone, composed principally of quartz is being distributed by the Wirt Co., Philadelphia. This insulator is said to have good mechanical strength and to be capable of withstanding a temperature of 800 degrees Fahr. without injury. It is also claimed to be able to endure a voltage of 400 per millimeter of thickness. It is advocated for use in signal system, telephone and telegraph work, electrical testing, motor regulation, etc.

FLEXIBLE SHAFTING.—A comprehensive bulletin 96 pages in length, is being distributed by the Stowe Mfg. Co., Binghamton, N. Y. The bulletin is devoted to flexible shafts and endeavors to show its wide application, particularly for use in connection with portable grinders and drills. In the fore part of the booklet a list of instructions, designed to enable the user of flexible shaft to find out the most profitable manner of using the shaft, is presented. Lists of small parts, sizes and prices are also presented. A telegraph code and index is included in the latter portion of the booklet.

INDUCTION MOTORS.—A comprehensive bulletin is being distributed by the Crocker-Wheeler Co., Ampere, N. J., describing squirrel-cage induction motors. These motors are 2 and 3-phase, 60 cycle and from 100 to 300 horsepower. The complete stator is made up of a housing, a core with its windings, bearing brackets and bearings. The stator housing consists of a cast iron box type frame designed for great rigidity. Openings are provided in the frame for ventilation. The stator core is made up of laminations punched from sheet steel annealed and insulated and supported by the stator housing. These and other small parts are individually described in the bulletin and also illustrated.

FAN OUTFIT.—Good ventilation is an economic and hygienic requisite for all whose work or recreation necessitates their being either temporarily or permanently indoors. To meet the extensive demand for motor-driven exhaust fans, the General Electric Co., Schenectady, N. Y., has standardized on fans in sizes ranging from 10¼ to 48 inches inclusive. These fans are illustrated and described in a 16-page bulletin recently issued by the above company. The fans may be adapted to both direct and alternating current and the bulletin endeavors to show just how installations are made and places where they are most necessary. Specification tables and diagrammatic views of small parts are also presented in the bulletin.

HEATING SYSTEMS.—A 16-page booklet describing heating systems was recently issued by the Skinner Bros. Mfg. Co., St. Louis. The Baetz air heater manufactured by this company is constructed of steel plates and angles. The upper part is occupied by coils of steam pipe, the pipes being so arranged that they may be easily taken out in case of repairs. The blower or fan is placed beneath them in the same enclosure. The air is drawn in by the fan from two sides and forced against the steam heated coils. The heaters are motor driven. A widely diversified line of photographs showing air heaters in operation are reproduced in the bulletin. Letters from users of Baetz air heaters are likewise produced presenting criticisms of these products.

TOOLS.—Chrome nickel steel tools with stellite bits are described and illustrated in an 8-page bulletin recently published by the Ready Tool Co., Bridgeport, Conn. Only the upper portion of the bit is stellite; the lower portion which is chrome nickel steel is welded onto the shank. It is claimed that the employment of stellite in this manner will be found economical due to the small amount of waste. Specification tables are included in the bulletin. In a second bulletin published by this company cutting tools are discussed in more detail. All sizes and shapes are illustrated to facilitate ordering. Ingredients used in the manufacture of tools and the most economical methods of using are likewise presented.

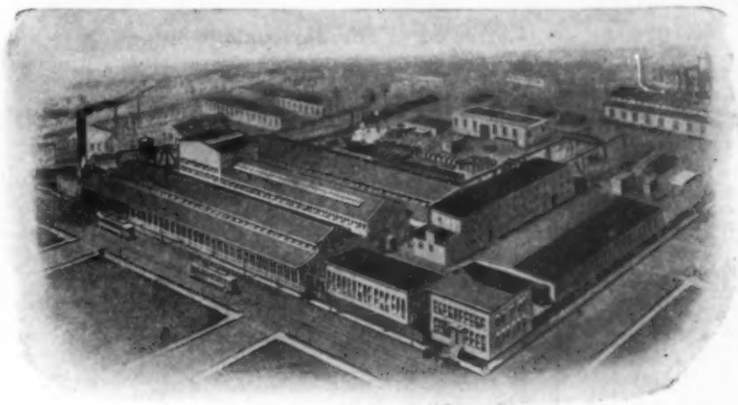
CHIPPING HAMMERS. — The Ingersoll-Rand Co., New York, recently published two interesting bulletins devoted respectively to chipping hammers and core brakers. Chipping hammers are made in seven sizes, the five large sizes being suitable for chipping, calking, beading and heavy scaling; the two smallest sizes, generally referred to as scaling hammers, are valveless tools for light chipping and scaling purposes. The handles are drop forgings, sandblast finished. The handle is attached to the cylinder by means of two bolts on the side of and parallel to the cylinder; lock washers are said to maintain an air tight joint. The valve chamber is independent of the piston chamber. Core brakers described in the second bulletin are especially adapted to breaking cores in foundry work, tearing up asphalt pavements, stripping and picking coal in mines and other work of a similar character.

FLINT SHOT.—"Little Journeys of the Flint Shot Man" is the title of an interesting 48-page bulletin issued by the United States Silica Co., Chicago. The booklet is published somewhat on the order of a magazine and contains many interesting article on flint shot, the part it plays in sand blasting, and other material of a similar character. Titles of a few of these articles are "Preparing Metal Surfaces," "Flint Shotting vs Ordinary Sand Blasting," "Types of Sand Blasting Apparatus," "Making Use of the Waste Stock," etc. As an example of the effectiveness of flint shot, the bulletin shows an enormous herringbone gear, approximately 12 feet in diameter, said to have been sand blasted completely with flint shot in six hours. Criticisms are also reproduced in the booklet showing opinions of users of flint shot in regard to this product. Section 3 of the bulletin shows the wide application of flint shot.

ASH CONVEYORS.—A novel bulletin devoted to ash conveyors was recently issued by the George J. Hagan Co., Pittsburgh. One of the most important features of the Hagan ash conveyor is said to be the patented steam nozzle. It is claimed that if this nozzle, which is made of Monell metal, should wear a sixteenth of an inch, small openings leading to an annular chamber in the bushing are uncovered causing steam to escape through a cored chamber in the bushing, which automatically blows a whistle giving the alarm that the nozzle should be replaced. The joints are also said to be important elements in the ash conveyor. The pipe flanges are 1 inch from the pipe body and are 1¼ inches thick. Flanges are grooved for the application of ring gaskets. Thus the gasket sits 1 inch from the inside surface of the pipe and the pipe must be entirely worn out before it is reached. Many other individual parts of the ash conveyor are described in the bulletin, including dust eliminators, blast gates, impact elbows, steam jets and air inlet.

FEED WATER HEATERS. — A booklet lately circulated by the Platt Iron Works, Dayton, O., illustrates several different types of feed water heater and supplements these illustrations with a short discussion of the construction and operating details of the heaters. The open feed water heaters are built of cast iron throughout, with the exception of the vertical steel shell heater. The smaller sizes of vertical heaters have a one-piece body; larger sizes are being built in two pieces. Accessories are securely bolted to the heater body. In the closed-type of water heater, the water is passed through the heating chamber six times, before it reaches the hot water outlet, this it is claimed, results in a high velocity of flow, a long period of contact between water and tubes, and a large heating surface. The hot water service heater combines a steel plate shell, a dished head at one end and a heavily designed cast iron head at the other end, the tubes being expanded into the cast iron head, thus allowing of easy removal. Division of the shell is made horizontally into two compartments, allowing the water to make two passes over the steam in the tubes. The water flows in the opposite direction to the steam, thus providing a counter-current action, which it is said results in a high efficiency.

PYROMETERS.—An optical pyrometer for works use is described in a recent bulletin published by the Leeds & Northrup Co., 4901 Stenton avenue, Philadelphia. In the focal plane of a small telescope is placed the filament of a small tungsten lamp, the current for which is supplied by a storage battery carried in a case slung from the shoulder. By means of a rheostat, the observer adjusts the current through the lamp until the filament merges or disappears in the background formed by the object looked at, whereupon he reads the current from a milliammeter mounted upon the battery case. A calibration chart converts the milliammeter reading temperature. It is stated that the setting can be made with great precision, due to the rapid change in the intensity of light emitted by the hot objects with change in temperature, and to the sensitiveness of the eye in differentiating the brightness of superposed objects. A color screen is interposed between the eye and the focal plane so that only monochromatic light reaches the eye. Color blindness therefore is no hindrance to the use of the instrument and it is claimed that different observers agree within 3 degrees Cent. The instrument is as easily sighted as an opera glass and a large surface to sight at is not required. Distance also does not matter and the observer can stand 5, 100 or 200 feet from an ingot, billet or furnace and get the temperature accurately.



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A crane embodying the elements of safety, substantial design and excellent construction; an organization composed of executives and engineers who have grown up with the crane business; a plant equipped with modern machine tools. PROMPT DELIVERY! All of this at your service.

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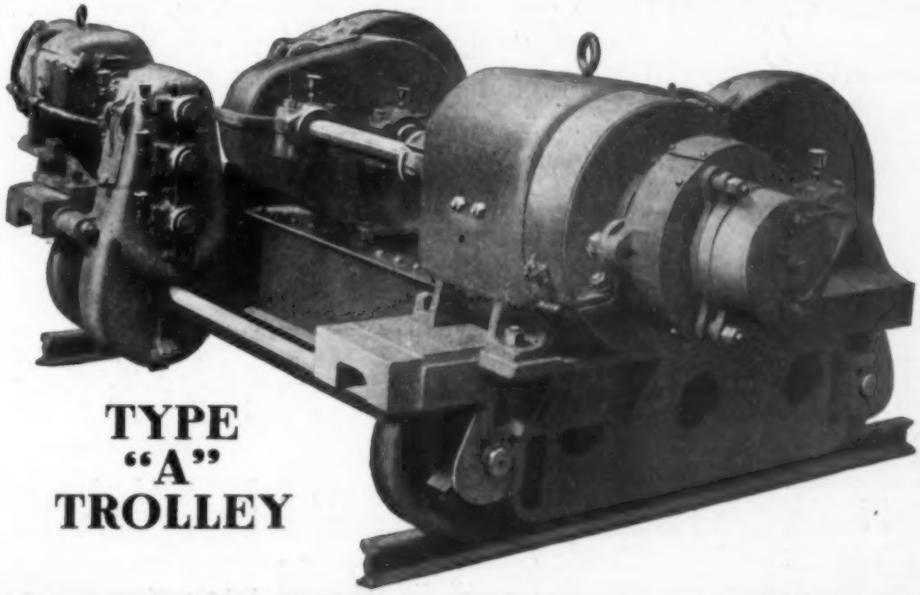

TYPE "A" TROLLEY

Say you saw it in THE IRON TRADE REVIEW

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.

Old range Bessemer, 55 iron	5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05

Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.

Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75c

WAREHOUSE PRICES

Steel bars, Chicago	4.50c
Steel bars, Cleveland	4.50c to 5.00c
Steel bars, Detroit	4.50c
Steel bars, Philadelphia	5.00c to 5.50c
Steel bars, New York	4.75c to 5.00c
Steel bars, St. Louis	4.55c
Steel bars, Cincinnati	4.65c
Steel bars, St. Paul	4.60c
Steel bars, Buffalo	4.60c to 5.10c
Iron bars, Chicago	4.50c
Iron bars, Cleveland	4.45c to 4.95c
Iron bars, Detroit	4.50c
Iron bars, St Louis	4.45c
Iron bars, Cincinnati	4.65c
Iron bars, Philadelphia	5.00c to 5.20c
Iron bars, New York	5.00c
Shapes, Chicago	5.00c
Shapes, Detroit	5.00c
Shapes, St. Louis	5.05c
Shapes, St. Paul	5.10c
Shapes, New York	5.00c to 5.25c
Shapes, Cleveland	5.00c to 5.25c
Shapes, Philadelphia	5.00c to 5.50c
Shapes, Buffalo	5.10c to 5.35c
Shapes, Cincinnati	5.15c
Plates, Chicago	7.00c
Plates, Detroit	9.00c to 10.00c
Plates, St. Louis	7.05c
Plates, St. Paul	7.10c
Plates, New York	8.00c to 10.00c
Plates, Cleveland	9.00c to 10.00c
Plates, Philadelphia	9.00c
Plates, Cincinnati	7.50c
No. 10 blue anl. sheets, Chi.	9.50c
No. 10 blue anl. sheets, Cleve.	8.50c
No. 10 blue anl., Buffalo	11.00c to 11.75c
No. 10 blue anl., sheets, St. L.	9.55
No. 10 blue anl. sheets, Cinci.	8.00c
No. 10 blue anl. sheets, St. Paul	9.60c
No. 10 blue anl. sh., Detroit	9.50c
No. 28 black sheets, Chgo.	9.25c
No. 28 black sheets, Cleve.	8.50c
No. 28 black sheets, Cinci.	7.65c
No. 28 black, Detroit	9.50c
No. 28 black sheets, St. L.	9.25c
No. 28 black sheets, St. Paul	9.60c
No. 28 galv. sheets, Chgo.	11.00c
No. 28 galv. sheets, Cleve.	10.00c
No. 28 galv. sheets, Cinci.	9.65c
No 28 galvanized, Detroit	11.00c
No. 28 galv. sheets, St. L.	11.50 to 11.75
Hoops, Cleveland	6.00c
Hoops, Detroit	7.00c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	21.25 to 22.00
Bundled sheets, Buffalo	19.00 to 20.00
City wrought, short, N. Y.	25.00
Frogs, switches, guards, St. L.	26.00 to 27.00
Heavy melting steel, Pitts.	28.00 to 29.00
Heavy melting steel, Buffalo	27.00 to 28.00
Heavy melting steel, Chgo.	27.00 to 27.50
Heavy melt'g steel, Cleveland	26.75 to 27.50
Heavy melting steel, Cinci.	24.50 to 25.00
Heavy melting steel, east. Pa.	25.00 to 27.00
Heavy melting steel, N. Y.	25.00
Heavy melting steel, St. L.	27.00 to 28.00
Heavy melting steel, Birming.	19.00 to 20.50
Hydraulic pressed sh't, Cleve.	24.50 to 24.75
Hydraulic press. sheets, Pitts.	24.00 to 25.00
Hydraulic pressed sh'ts, Chgo.	23.00 to 24.00
Low phos. steel, Buffalo	36.00 to 38.00
Low phos. steel, Pittsburgh	38.00 to 40.00
Low phos. steel, eastern Pa.	36.00 to 38.00
Shoveling steel, Chicago	23.50 to 24.00
Shoveling steel, St. Louis	22.00 to 23.00
Steel rails, short, Chicago	33.00 to 34.00
Steel rails, short, Cleveland	31.00 to 31.50
Steel rails, short, St. Louis	32.00 to 33.00
Steel rails, old, Birmingham	23.00 to 24.00
Stove plate, Cincinnati	15.50 to 16.00
Stove plate, St. Louis	10.00 to 11.00
Stove plate, N. J. points	18.50 to 19.00
Stove plate, Birmingham	16.00 to 17.00
Stove plate, Buffalo	20.00 to 21.00
Stove plate, eastern Pa.	20.50 to 21.00
Stove plate, Pittsburgh	20.00 to 21.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$17.00 to 18.00
Boiler plate, cut, No. 1, St. L.	14.00 to 16.00
Bundled sheets, Cincinnati	16.50 to 17.00
Knuckles, coup., Chicago	30.00 to 31.00
Knuckles, coup., St. Louis	32.00 to 33.00
Springs, Chicago	34.00 to 35.00
Stove plate, Chicago	16.50 to 16.75
Stove plate, Cleveland	17.00 to 18.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	4.25
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	76.1 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama	61.0 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Buffalo	25.00 to 26.00
Busheling, No. 2, Buffalo	17.00 to 18.00
Busheling, No. 1, Pittsburgh	21.00 to 22.00
Cast borings, New York	17.00 to 17.50
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Pittsburgh	19.50 to 20.50
City wrought, long, N. Y.	31.00 to 32.00
Forge flashings, small, Cleve.	23.50 to 24.00
Forge flashings, large, Cleve.	22.00 to 23.00
Forge No. 1 Eastern Pa.	21.00 to 22.00
Grate bars, Buffalo	20.00 to 21.00
Grate bars, N. J. points	18.50 to 19.00
Iron Axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.50 to 43.00
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Buffalo	45.00
Iron rails, Chicago	36.00 to 37.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.00 to 32.50
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	40.00 to 40.50
Machine turnings, Buffalo	$16.50 to 17.00
Machine shop turnings, N. Y.	17.50 to 18.00
Mach. shop turnings, Pitts.	18.00 to 18.50
Mch. shop turnings, east. Pa.	18.00 to 19.00
Machine turnings, Birming.	11.00 to 12.00
R. R. mch. cast, No. 1, Buff.	27.00 to 28.00
R. R. wrought, 1, Buffalo	36.00 to 37.00
R. R. wrgt., No. 1, east. Pa.	37.50 to 40.00
R. R. wrought, No. 1, Pitts.	32.00 to 34.00
R. R. wrought, 1, B'ham.	24.50 to 25.50
Wrought pipe, Buffalo	26.00 to 27.00
Wrought pipe, eastern Pa.	28.50 to 29.50
Wrought pipe, New York	25.00 to 26.00

(Net Tons)

Angle bars, iron, Chicago	$33.50 to 34.00
Angle bars, steel, St. Louis	24.00 to 25.00
Arch bars & transoms, St. L.	34.00 to 35.00
Arch bars & transoms, Chgo.	35.00 to 36.00
Busheling, No. 1, Chicago	21.00 to 21.50
Busheling, No. 1, Cincinnati	21.00 to 21.50
Busheling, No. 1, Cleveland	22.25 to 23.00
Busheling, No. 1, St. Louis	17.00 to 18.00
Busheling, No. 2, Chicago	14.00 to 15.00
Cast borings, Cincinnati	12.50 to 13.00
Cast borings, Cleveland	16.00 to 16.50
Cast borings, St. Louis	12.00 to 13.00
Cast borings, Chicago	15.00 to 15.50
Cut forge, Chicago	27.00 to 27.50
Grate bars, Cleveland	17.25 to 18.50
Iron axles, St. Louis	36.00 to 37.00
Iron axles, Chicago	41.50 to 42.50
Iron axles, Cleveland	44.00 to 45.00
Machine shop turnings, Chgo.	15.50 to 16.00
Mach. shop turnings, Cleve.	15.75 to 16.00
Machine shop turn'gs, Cinci.	13.00 to 13.50
Mach. shop turnings, St. L.	14.00 to 15.00
Pipes and flues, Cleveland	21.50 to 22.50
Pipes and flues, Chicago	18.50 to 19.00
Pipes and flues, St. Louis	15.00 to 16.00
Railroad wrought, 1, Cleve.	34.00 to 35.00
Railroad wrgt., No. 1, Chgo.	30.00 to 31.00
Railroad wrought, 1, Cinci.	28.50 to 29.00
Railroad wrought, 1, St. L.	29.00 to 30.00
Railroad wrgt., No. 2, Chgo.	27.00 to 27.50
Railroad wrought, 2, St. L.	26.00 to 27.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$22.00 to 23.00
Axle turnings, Buffalo	25.00 to 26.00
Shafting, New York	36.00
Shafting, eastern Pa.	38.00 to 40.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	46.00
Steel car axles, Buffalo	45.00
Steel car axles, Cleveland	46.00 to 47.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	50.00 to 55.00

(Net Tons)

Shafting, St. Louis	35.00 to 37.00
Steel car axles, St. Louis	34.00 to 35.00
Steel car axles, Chicago	39.00 to 40.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	30.00 to 31.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	30.00 to 31.00
Car wheels, Buffalo	30.00 to 31.00
Car wheels, Chicago	25.50 to 26.50
Car wheels, St. Louis	29.00 to 30.00
Car wheels, Birmingham	21.50 to 22.50
Car wheels, Cleveland	26.00 to 26.50
Tram car wheels, Birming.	19.00 to 20.00
Cast, No. 1, Birmingham	22.00 to 23.00
Cast, 1, machy., N. J. points	32.00 to 33.00
Cast, 1, heavy, N. J. points	30.00
Cast, No. 1, eastern Pa.	28.00 to 30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	20.50 to 21.00
Malleable railroad, Cleveland	27.00 to 27.50
Malleable railroad, Buffalo	28.00 to 29.00
Malleable railroad, Pittsburgh	28.00 to 29.00
Malleable railroad, east. Pa.	30.00 to 32.00

(Net Tons)

Cast No. 1, Cleveland	22.50 to 23.50
Cast, No. 1, Chicago	21.00 to 22.00
Cast, No. 1, Cincinnati	23.00 to 23.50
Cast, No. 1, St. Louis	19.00 to 20.00
Malleable railroad, Chicago	26.00 to 27.00
Malleable railroad, St. Louis	24.00 to 25.00
Malleable agricultural, Chgo.	22.00 to 23.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$34.00 to 36.00
Reroll. rails, 5 ft. & ov., Chgo.	35.50 to 36.00
Reroll. rails, 5 ft & ov., E. Pa.	28.00 to 32.00
Reroll. rails, 5 ft. & ov., St. L.	36.00 to 37.00
Reroll. rails, 5 ft. or ov., Cleve.	37.00 to 38.00
Rerolling rails, long, Birming.	37.50 to 38.50

(Net Tons)

Boiler punchings, Chicago	30.50 to 31.50
Locomotive tires, Chicago	32.50 to 33.50
Locomotive tires, St. Louis	33.00 to 34.00